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DEFENCE HELICOPTER

Editor
Tony Skinner, *tony.s@shephardmedia.com*
Tel: +44 1753 727020

Staff Reporter
Jonathan Tringham, *jonathan.t@shephardmedia.com*

Business Reporter
Joyce de Thouars, *joyce.t@shephardmedia.com*

Contributors
Patrick Allen, Gordon Arthur, Pieter Bastiaans, Peter Donaldson, Jim Dorschner, Scott R Gourley, Neelam Mathews, Alexander Mladenov, David Oliver, Richard Scott, Matthew Smith, Alan Warnes, Jim Winchester, Tom Withington

Production Department Manager
David Hurst, *david.h@shephardmedia.com*

Sub-editor
Adam Wakeling

Commercial Manager
Jane Smith, *jane.s@shephardmedia.com*
Tel: +44 1753 727004

Junior Sales Executive
Sara Sheperia, *sara.s@shephardmedia.com*
Tel: +44 1753 727003

Editor-in-Chief
Tony Skinner

Managing Director
Darren Lake

Chairman
Nick Prest

SUBSCRIPTIONS
CDS Global, Tower House, Lathkill Street, Sovereign Park, Market Harborough, Leics LE16 9EF, UK
Paid subscription contacts:
Tel: +44 1858 438879
Fax: +44 1858 461739
Email: *shephardgroup@subscription.co.uk*

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The Shephard Press Ltd
268 Bath Road, Slough, Berks, SL1 4DX, UK
Tel: +44 1753 727001
Fax: +44 1753 727002

www.rotorhub.com

Front cover: Two RAF Puma HC2 aircraft work together with the Chinook force during Exercise *Agile Spear* in Norfolk, UK in November 2013. (Photo: Crown Copyright)

IN THE NEXT ISSUE
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Sequestration eases,
but the budgetary future stays uncertain

SO IT SEEMS THE POLITICAL WRANGLING over the US budget – a process that is largely unfathomable to those outside the Beltway – may finally be subsiding, allowing some measure of longer-term planning to take place.

The deal that was signed by President Obama on 26 December was unsurprisingly welcomed by aerospace and defence companies, given the uncertainty that has lingered over the industry in recent years due to the budgetary self-immolation that is sequestration.

Automatic spending cuts will now be eased, allowing expenditure to rise by $63 billion over scheduled levels in FY2014 and 2015 – although defence spending, now set at $498 billion, is still $30 billion below the requested budget, with FY2015 not yet mapped out.

Congress is now being urged to create more certainty beyond the coming two fiscal years.

'We hope Congress will use this time wisely to develop a long-term plan,' Marion Blakey, president and CEO of the US Aerospace Industries Association (AIA), said in December. 'Our number one priority will be to ensure stable and predictable budgets for national security, civil aviation and space.'

Such comments reflect the depth of feeling of industry executives over the past two years, several of whom have bitterly complained to me that if comprehensive cuts were unavoidable, the government should just move forward and enact them so that suitable business strategies can be put in place.

That's what doing business is all about – judiciously reacting to what is in front of you. It was clearly the uncertainty that has been the killer, limiting the ability of companies to plan and invest in infrastructure, personnel and R&D, or alternatively to reduce head counts and restructure.

So while this latest progress will be welcomed – allowing the Pentagon to invest in some much-needed capabilities – real concerns remain.

Investment in R&D and procurement currently amounts to 29% of the top-line defence budget, which is below the 35% the AIA believes is necessary to maintain a healthy industrial base.

There are also significant pressures on the supply chain, with those in the lower tiers of the industry harder hit by the decline in defence revenues than the bigger players, who have a more diverse portfolio.

However, even prime aerospace companies are searching for export growth to offset the decline in US spending, as we discover this issue with features on India (p13) and the Asia-Pacific market (p32).

NO MORE KIOWA?

For the US military, which has long had access to funds that have long made it the envy of others around the world, the budget realities also seem to be finally hitting home.

The OH-58 Kiowa Warrior now looks likely to be put on the chopping block, and the armed scout role handed over instead to the army's AH-64 Apache.

While a final decision had yet to be officially made at the time of writing, the level of detail about the proposal provided at the recent AUSA Aviation conference by army officials suggests the plan is well advanced.

I must admit the news that Kiowa may be removed from service altogether – a move that will also likely sound the death knell for the Armed Aerial Scout (AAS) programme to replace the OH-58 – did not initially sit well.

The army has frequently stressed over the last decade that the Kiowa Warrior has had the highest operational tempo of any of its aircraft in-theatre in Afghanistan.

On average, the type has maintained a monthly operational tempo of about 75 hours – that number was more than 100 hours a month in 2012 – accounting for nearly 50% of all army reconnaissance and attack missions flown in Iraq and Afghanistan from 2001 to 2010.

Handing these missions over to the Apache seems an expensive and overly complex solution to the reconnaissance mission, even if some of the burden is taken over by unmanned aerial platforms.

Conversely, however, the proposal is also an indication of the army's determination to reshape itself to address prevailing budgetary realities, even if that stance means losing a much-tasked aircraft and potentially reducing the number of active combat aviation brigades.

Despite the unfortunate personnel upheavals that will come as a result, the army's consolidation of its helicopter fleet is one way to better position itself for the future, much as it did when it divested itself of the Cobra and Huey in the 1990s.

With details of the plan now emerging, industry will be hoping that the army is forthcoming with the particulars, so companies don't keep spending money chasing procurement dollars that suddenly vanish, as has happened with the AAS project in recent years.

Tony Skinner, Editor

Israel, Japan move ahead with Osprey acquisition

AFTER PRECISELY ZERO BELL-BOEING V-22 Osprey export contracts to date, two have now come along at once with both Israel and Japan showing interest in the combat-proven tiltrotor.

Israel has now formally requested a sale of six V-22s, according to a 14 January press release by the US Defense Security Cooperation Agency.

The latest step confirms announcements by Pentagon officials in late 2013 which indicated that the US would facilitate the fast-track procurement of V-22s for Tel Aviv in an FMS deal estimated at $1.13 billion.

The Israeli aircraft will come from available capacity in the second multi-year procurement contract, which the DoD signed with Bell-Boeing on 12 June. All will be delivered to the current Block C standard, which benefits from a number of reliability, maintainability and mission improvements that have been introduced into the production line.

With the IDF preparing for a series of contingencies in the Middle East due to tensions with Iran and the ongoing civil war in Syria, the V-22 will be a complement to the upgraded CH-53 Yasur 2025 medium transport helicopters, which will continue to serve until at least 2025.

Meanwhile, the Japan Air Self-Defence Force plans to acquire 17 V-22s plus three Global Hawk UAVs to bolster defences against an increasingly aggressive China.

On 17 December, Prime Minister Shinzo Abe's cabinet endorsed plans to acquire the tiltrotors alongside amphibious vehicles, F-35 fighters and support aircraft, under plans set out in the five-year Mid-Term Defence Programme, which is budgeted at $239 billion, and will commence in FY2014.

'This shows our foreign and security policy with great clarity and transparency to the people of Japan and to the world. Based on cooperation with other countries, we want to make greater contributions than in the past to the peace and security of international society,' Abe told reporters after the decision.

By Pieter Bastiaans, Breda and Jonathan Tringham, London

Spending bill to fund USAF CSAR helicopter

Photo: USAF

THE USAF IS SLATED TO RECEIVE FUNDING for its Combat Rescue Helicopter (CRH) programme under a government-wide omnibus spending bill, unveiled by the White House on 13 January.

CRH, intended to replace the air force's fleet of ageing HH-60 Pave Hawk helicopters, has been designated a 'Congressional special interest item' and will receive $333.5 million in funding, according to the new bill.

While acknowledging the aircraft need to be replaced, Congressional appropriators have ensured an 'affordable' budget allocation to prevent the programme from being 'cancelled due to insufficient funding in future years'.

'The air force must continue to assess its acquisition strategy to find ways to control costs and ensure that the programme remains on track to deliver these helicopters to the fleet,' the bill reads.

According to the bill, any decision to terminate CRH must be preceded by a review of the programme's 'threshold' and 'objective' requirements, combined with an analysis of 'alternative acquisition strategies using cost-benefit analysis', to be conducted by the Secretary of the Air Force and the Chief of Staff of the Air Force.

Sikorsky spokesman Frans Jurgens said it was encouraging that Congress continued to support the CSAR mission with available funds.

'We await confirmation that continued funding exists for FY2015 and beyond to enable a contract award this year,' he said in a written statement.

In November, the USAF announced its intention to move forward with Sikorsky as the sole bidder for CRH, providing sufficient funds were allocated in the 2014 defence budget.

'In response to the CRH solicitation, the USAF received one proposal. That offer, from Sikorsky Aircraft Corporation, has provided an acceptable technical solution and the USAF intends to award a contract based upon budget availability,' an air force spokesman confirmed at the time.

The statement indicated that the service was laying the groundwork to award the CRH contract in Q2 FY2014.

However, according to a USAF statement, the award was 'contingent on the outcome of the President's budget review process, where CRH would need to be funded across the future year's defence programme'.

By Jonathan Tringham, London

AgustaWestland attempts to save Indian contract

AGUSTAWESTLAND IS PREPARING for last-ditch negotiations following a decision by the Indian government to formally cancel the procurement of 12 AW101 VVIP helicopters.

On 2 January, New Delhi announced it had terminated the $750 million deal, signed in 2010, on the grounds of a breach of the pre-contract integrity pact. The termination followed an investigation into allegations of bribery involving Indian officials.

Upon receiving formal notification of termination, AgustaWestland 'welcomed' the news that India had at last agreed to appoint an arbitrator.

The Anglo-Italian company had been pressing for arbitration since November 2013 – when it announced the appointment of its own arbitrator – and continues to maintain that the accusations of corruption are baseless.

In a statement, the Attorney General of India said that although integrity-related issues were not subject to arbitration, 'with a view to safeguard the interests of the government, the MoD has nominated its arbitrator'.

With three helicopters already delivered and a 45% advance paid by India, it is not clear how long negotiations will take before the issue is ironed out.

AgustaWestland spokesman Geoff Russell said it was difficult to say what state the contract was in, given the complications to date.

'The Indian statement talks about termination – [the Indian MoD] unilaterally suspended payment in February, which was in breach of the terms of the contract. We appointed an arbitrator back in October, and at the time the Indian MoD said they wouldn't get involved in arbitration,' he said.

'They've now appointed an arbitrator, and there is now a requirement for both parties to agree on a third arbitrator, and that process will continue.'

The decision to cancel the contract as India edges towards national elections has become politically charged.

'[The cancellation is] just to save the name and to avoid the defamation of the first family of the Congress [Party]. Though the helicopters are good, the Congress has indulged in corruption,' said Prakash Javadekar of the opposition Bharatiya Janata Party.

By Neelam Mathews, Delhi and Jonathan Tringham, London

Libya interested in T129

Photo: TAI

LIBYA HAS EXPRESSED INTEREST in acquiring the T129 attack helicopter, it emerged during Prime Minister Ali Zeidan's visit to Turkish Aerospace Industries (TAI) on 3 January.

The T129 performed a flight demonstration, after which the Libyan delegation, accompanied by Turkey's Undersecretary for Defence Industries Murad Bayar, examined the platform together with the Hürkuş trainer aircraft.

In a joint press conference with his Turkish counterpart Recep Tayyip Erdogan, Zeidan highlighted Libya's requirement for helicopters and assault boats to strengthen the country's coastal security capabilities.

TAI is also looking to enter other export markets with the T129. Jordan and Pakistan have already made enquiries, and Malaysia, Oman, Qatar and Saudi Arabia have reportedly also shown interest in the aircraft.

To pave the way for any future sale of T129s to Pakistan, TAI signed a workshare agreement with the Pakistan Aeronautical Complex (PAC) in 2013 following Islamabad's decision that all future acquisitions should include offset arrangements.

Under the agreement, PAC builds components for TAI's Anka UAV while looking forward to collaboration on the T129 programme.

By Joyce de Thouars, London

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Sikorsky retains Canadian maritime helicopter contract

THE CANADIAN GOVERNMENT HAS OPTED to retain Sikorsky as the contractor for the troubled Maritime Helicopter Project (MHP), it has been revealed.

On 3 January, Ottawa and Sikorsky announced an agreement to continue the multi-billion-dollar programme under revised terms, after an independent enquiry determined this would be the most cost-effective way forward.

Hitachi Consulting, the company hired by the Canadian government to assess the viability of Sikorsky's CH-148 for the MHP, determined the programme could continue with a 'different project structure and governance model'.

Under new principles of agreement signed by both parties on 31 December, Sikorsky will deliver helicopters with operational capability sufficient to begin retirement of Canada's fleet of ageing CH-124 Sea Kings in 2015.

In addition, the company will provide a programme to enhance those capabilities, culminating in a fully capable CH-148 by 2018.

Diane Finley, Canada's Minister of Public Works and Government Services, said that under the new arrangement Sikorsky would deliver the required capability at 'no additional cost'.

'In addition, the Government of Canada will only issue further payment to Sikorsky upon capability delivery,' she said in a written statement.

Canada had originally contracted Sikorsky for 28 CH-148s – a militarised variant of the S-92 – to replace its 1960s-era Sea King fleet in November 2004, at a total value of $5 billion, comprising $1.8 billion for the helicopters and $3.2 billion for 20 years of in-service support.

No finalised aircraft have been delivered, despite an initial in-service date of 2008, leaving Sikorsky facing $88.6 million in liquidated damages for its failure to meet the contract deadlines.

The new agreement follows a lengthy period of tense negotiations, which saw Canadian officials meet with executives from AgustaWestland, Eurocopter and Sikorsky to look at various ways to move the Sea King replacement effort forward.

By Jonathan Tringham, London

DoD helicopter spending to decline by half

Photo: Boeing

US SPENDING ON MILITARY HELICOPTERS will fall by almost 50% from $12.4 billion in 2012 to $6.7 billion in 2018, Frost & Sullivan has predicted.

As a result of tightening budgets, the majority of expenditure will be on upgrading and remanufacturing existing platforms, with OEMs increasingly focusing on efficiency of maintenance in order to reduce costs.

There will also be a number of new programmes as some aircraft are overdue for replacement after continuous deployment and operation in harsh environments in recent years.

'New programmes will favour modifying commercial off-the-shelf aircraft rather than developing aircraft from the ground up,' said Michael Blades, aerospace and defence senior industry analyst at Frost & Sullivan, on 17 December.

When selecting new platforms, life cycle costs will be increasingly important. 'In both the civil and military markets, end users will stress total life-cycle costs rather than acquisition costs,' Blades said.

The CH-47 and UH-1 fleets will reach the end of their service lives between 2030 and 2040 after having been used for combat, combat support and humanitarian missions over recent decades.

In addition, the UH-60 Black Hawk and AH-64 Apache will be replaced after 2030 under the US Army's Future Vertical Lift programme.

By Joyce de Thouars, London

US Army helicopters get enhanced warning system

US ARMY HELICOPTERS ARE RECEIVING a hostile fire indication capability as part of upgrades to the AN/AAR-57 Common Missile Warning System (CMWS), currently produced by BAE Systems, it has been confirmed.

The company announced on 14 January that it had received a $39 million contract for more than 300 third-generation (Gen3) CMWS units, which provide warning of small arms and RPG fire, as well as new data-recording capabilities for post-mission analysis.

The order is the first part of a planned $500 million procurement that will see Gen3 systems fielded to more on 1,000 army helicopters over the next two years. In-theatre installations have already begun on Apache, Kiowa Warrior and Black Hawk aircraft stationed in Afghanistan.

Speaking to *Defence Helicopter* at the AUSA exhibition in October, BAE Systems director of threat management solutions Bill Staib noted that, in addition to the new software upload, upgrades to the CMWS sensor and processor unit also promise a seven-fold increase in sensitivity.

By Tony Skinner, London

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RAF Puma HC2s line up at Benson. (Photo: RAF Benson)

The UK is currently carrying out a number of military helicopter upgrade programmes to meet the recommendations outlined by the government in 2010. **Patrick Allen** visited RAF Benson to see the work in progress.

Home improvement

Over the past three years, the UK's Joint Helicopter Command (JHC) has been implementing the recommendations outlined in the government's 2010 defence review, alongside conducting operations in Afghanistan.

One of the recommendations for the Strategic Defence and Security Review Future's Force 2020 was to ensure the country's helicopter capability remained up to date, with the upgrade and purchase of new aircraft.

It includes the retirement of the RAF/Royal Navy's (RN's) fleet of Sea Kings in March 2016 and the transfer of the former service's AgustaWestland AW101 Merlin HC3/HC3A fleet to the RN's Commando Helicopter Force (CHF), plus the upgrade of the RAF Puma HC1 fleet to HC2 standard.

STAYING CURRENT

Philip Dunne, Minister for Defence, Equipment, Support and Technology, noted: 'In 2012, we committed to spending £12.1 billion [$19.8 billion] to ensure our helicopter capability remains up to date.'

This has also included upgrading the Boeing Chinook HC4/5s, purchasing new HC6s and the introduction of the new AgustaWestland AW159 Wildcat AH1s and HM1s, as well as the upgrades to Merlins and Pumas.

Both the Merlins and Pumas are operated by the RAF, based at Benson in Oxfordshire, which is currently home to two thirds of the service's support helicopter force and is one of the busiest stations within the JHC.

Over the past four years, the RAF Merlin Force has been overseeing the transition of its fleet to the RN's CHF and preparing for the introduction into operational service of the Puma HC2.

In his role as Merlin Force commander, Puma Force commander and station commander of RAF Benson, Gp Capt Nigel Colman has been

responsible for implementing all the changes as outlined in Future Force 2020.

'The key change demanded at RAF Benson has really been the necessity to change our mindset, from one which was largely based around a fixed routine of providing support to Operation *Herrick* in Afghanistan to one which will see the station on a contingency footing where we could be asked to deploy anywhere at any time,' explained Colman.

'Any such deployments could well be at very short notice, meaning that our people, and importantly their families, will need to have a very flexible, responsive and expeditionary outlook on life operating support helicopters.

'An example of this is that we can load two Puma HC2s and all their supporting personnel and equipment very quickly into an RAF C-17 transport aircraft and have the aircraft flying within four hours of landing at their destination – this is a fantastic capability which would be extremely valuable, whether in a warfighting scenario or for humanitarian and disaster relief/ non-combatant evacuation operation.'

INTIMATE RELATIONSHIPS

Colman said another key initiative that has been taken is a shift to more 'intimate relationships' with the force's key 'users' across the British Army and Royal Marines.

'We are already spending significantly more time working alongside them, ensuring that the skills gained through Iraq/Afghanistan are maintained and improved,' he continued. 'This is being done through better and earlier planning, a more flexible approach to the user's requests, while also trying to think smarter about how the training needs of our aircrew and those of the ground units we support can be coordinated to mutual benefit.'

In November 2013, the first RAF crews began training on the Puma HC2 at RAF Benson following a £260 million ($425 million) upgrade programme.

Crews from No 33 and 230 Squadrons have already started undertaking training flights from the base. This has included using a simulator at RAF Benson and participation in a number of JHC exercises.

The Puma HC2 improvement programme included the upgrade to Turbomeca Makila turboshaft engines, which provide 35% more power and improved fuel efficiency. This will allow the type to fly faster and have twice the range as the HC1, which first entered service with the RAF in 1971.

The upgrade also includes a digitised glass cockpit and upgraded LCD instruments, as well as improved ballistic protection. The HC2 is capable of carrying up to 16 fully equipped troops, while twin cargo doors and low rotor downwash make it ideal for transporting personnel and equipment in and out of confined urban environments.

COMPREHENSIVE REWRITE

The RAF will eventually operate a fleet of 24 Puma HC2s – the remainder will be handed over during the next two years ahead of entering operational service in 2015.

'Because the Puma HC2 is so different from the Mk 1 version – from both engineering and aircrew perspectives – all training packages have been comprehensively rewritten for the Mk 2,' explained Colman.

'Indeed, while the aircraft is still called a Puma, and externally looks almost identical to the Puma HC1, the HC2 is a fundamentally different helicopter. The modern, more powerful engines provide a step-change in capability and deliver a significantly enhanced safety margin.

'They also not only outperform those they replace in power, but also in fuel efficiency – with the same fuel load, the aircraft has a 35% greater endurance, meaning greater range and more disposable payload. When this is coupled to an extra fuel tank it gives nearly three hours endurance.'

'They also not only outperform the engines they replace in power, but also in fuel efficiency.'

Further enhancements include a new digital cockpit and state-of-the-art autopilot. This integrates the aircraft communications, navigation and flight control systems, which greatly reduces pilot workload, enabling crews to concentrate on managing the mission rather than the aircraft. Additionally, the aircraft complies with all civil navigation and communication regulations, allowing it to self-ferry throughout Europe.

'Importantly, while the equipment is new it is not novel, and this has greatly simplified the introduction into service as the aircraft has commonality with existing civil and military types,' added Colman. 'Therefore, with all this new capability in mind, we have grasped the opportunity to review how we have done business in the past and implement new, sometimes innovative, approaches to not simply replicate but to improve.

'In so doing, we have consulted widely with other users of modern glass-cockpit

The RAF has been busy training RN CHF crews to operate the Merlin HC3/3A at Benson. (Photo: author)

aircraft with advanced autopilots, both within the rotary- and fixed-wing communities, military and civilian. This has enabled the most expeditious training route to allow us to return a greatly enhanced capability to UK defence at the earliest safe opportunity.'

CONVERSION TRAINING

The RAF Merlin Force has also been busy preparing the RN's CHF for the transfer of 25 Merlin HC3/3As.

Over the past two years, RAF personnel from No 28(AC) Squadron's Operational Conversion Flight based at Benson have been undertaking conversion training for CHF aircrew and engineers on the AW101.

The Merlin Force is now busy mentoring and training CHF aircrew and engineers on the operation and maintenance of the technologically advanced Merlin, while also providing a UK contingency capability.

'We have been engaged for some time now in training mainly ex-Sea King crews on Merlin HC3/3A, while also gradually replacing RAF engineers with RN maintainers as we work towards the transition of the Merlin capability to the CHF,' the group captain explained.

'While RN crews receive the same training as RAF crews new to the Merlin, we have ensured that this is done not only through the Merlin Operational Conversion Course, but through the delivery of environmental training exercises in the testing – but controlled – environments of Jordan and El Centro in the US to ensure the RN capability grows rapidly through transition.

'As you would expect, the liaison between the Merlin Force and the CHF is detailed and pretty constant, covering all aspects of the transition, and there are inevitably areas where the RAF takes the lead and others where the RAF is very much in a supporting role. But it is important that after over ten years of operating Merlin, we don't lose the corporate experience present in the force and instead pass it on to our RN colleagues.'

COLD RESPONSE

As part of this training and transition, RAF/CHF Merlin crews will deploy in February/March 2014 to the JHC 'Clockwork' cold-weather and mountain-warfare training facility based at Bardufoss, a Royal Norwegian Air Force base 260km inside the Arctic Circle.

With the airmen working alongside CHF Sea King crews, this extreme cold weather

This year will see RAF and RN CHF Merlin crews training in Arctic Norway. (Photo: author)

environmental training package not only prepares JHC personnel – including aircrew, ground crew and support personnel – for operating in Arctic conditions, but also helps provide aircrew with pre-training for a range of global contingency operations.

By early 2014, more than 50% of CHF engineers will have completed their conversion course as training is ramped up at RAF Benson before the first fully qualified CHF crews and aircraft depart the base for RNAS Yeovilton in early 2015.

In addition, 846 NAS is planning to stand up as the first CHF Merlin HC3/3A squadron in late 2014 followed by 845 NAS as the second in August 2015.

By 2016, the CHF will have completed conversion to the Merlin and the number of its support helicopter crews will have reduced from 43 to 37.

The next phase of the programme under the Merlin Life Sustainment Programme (MLSP) will address obsolescence issues with the aircraft and develop its maritime capabilities.

MLSP will deliver increasing maritime capability from September 2015 through to the delivery of the Merlin HC4 and HC4A, which will deliver a further increase in embarked capability. The latter will begin arriving with the CHF from September 2017 and the programme is currently due to be completed by March 2022.

REPUTATION INCREASE

This increase in maritime capability is a significant advance for the Merlin and will see the airframe continue and further develop the reputation the CHF has gained for its contribution to UK defence with the Sea King HC4.

'Although we will not see the physical departure of Merlin aircraft, crews and engineers even begin until 2015, we are now deep in the preparation phase to ensure that we will be in a strong position to see Merlin depart RAF Benson and indeed leave the RAF inventory in style, having made a consistently valuable contribution to operations in Bosnia, Iraq and Afghanistan over the last ten years,' Colman said.

'But looking to the future, the Puma HC2 is a truly exciting development of the JHC's capability, and we are already witnessing the introduction of a far more capable aircraft than the Puma HC1. In this regard, the crews now qualified on the HC2 are reporting even better performance than expected, which will provide a step-change in the capability offered by the Puma Force.'

RAF Benson is also home to the Medium Support Helicopter Aircrew Training Facility with Puma, Chinook and Merlin simulators.

'One of the lessons that has been reinforced over the past few years has been that simulation is best located alongside the aircrew and the units it supports, and I expect RAF Benson will continue to be home to a number of simulators into the foreseeable future. Hence, we will work with JHC HQ to ensure that whatever synthetic solutions we have in the future – they offer best value for money and the best support to our aircrew.'

FUTURE FOCUS

Regarding the future of RAF Benson, the group captain noted: 'While there are a number of outputs on the station, not least 606 Royal Auxiliary Air Force Squadron, which contributes to defence's growing reliance on reserves, the two key outputs we contribute are the four squadrons of the Puma and Merlin Forces.

'Right now, we are in the midst of fielding the Puma HC2, which is a real boost to the JHC's lift capability and sees an exciting future for RAF Benson, while we also maintain the contingent capability provided by the Merlin Force as we progress through the transition to the RN. Clearly, as to any future moves, we remain alive to the fact that the geographic lay-down of defence is changing and we will accommodate any additional units we are asked to in due course.' ***DH***

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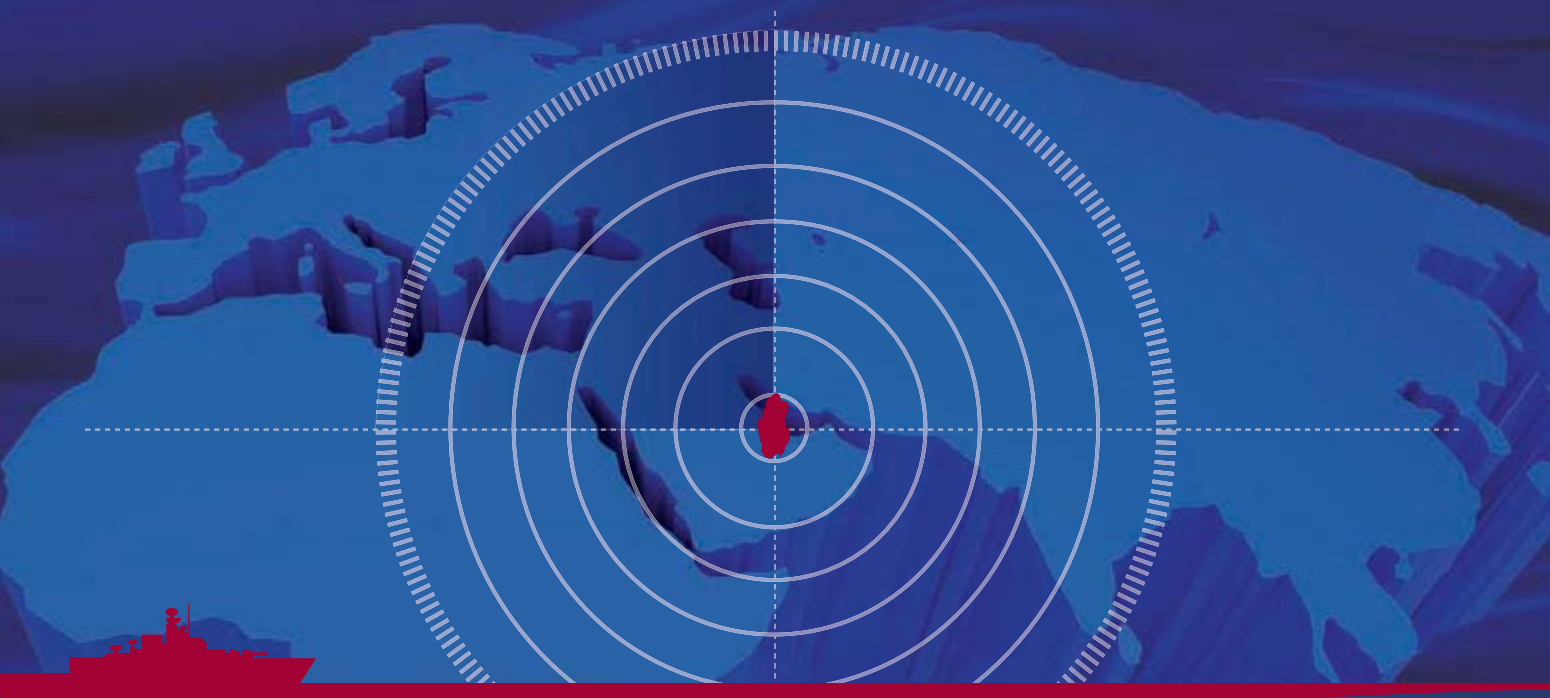

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The ALH Mk III, shown here at the 2013 Bangalore air show, is a development of the Dhruv and comes with seating for 14 fully equipped troops. (All photos: author)

No end in sight?

Shrouded by alleged business wrongdoings and a history of delayed programmes, India's acquisition of military helicopters is a hot topic. **Neelam Mathews** reports on current activity.

Helicopter procurements continue to make the news in India, but unfortunately often for the wrong reasons.

The forthcoming national elections have resulted in a policy paralysis, with the falling rupee and a slowed economy putting the brake on funds being released by the finance ministry.

Awaiting the delayed decisions is a military that urgently needs to fulfil its force requirements, including procurement of an estimated 1,000 helicopters by 2020 to include light utility, attack, medium transport, heavy-lift and multirole types. By comparison, there are around 600 rotorcraft of various vintages currently in the military.

While the delivery deadline may be optimistic given the long gestation periods of contract decisions, the potential and urgency cannot be waved away.

NEGOTIATING PHASE

Commercial negotiations with the Indian MoD for 15 CH-47 Chinooks worth around $1 billion and 22 AH-64E Apaches are taking place, according to Dennis Swanson, VP of international business development at Boeing Defense, Space & Security, speaking last year.

The Chinooks will be a direct commercial sale between the MoD and Boeing, while the Apache proposal, which was chosen over the Mi-28, also includes an FMS component. The FMS contract for the Apache includes munitions, training and aircraft certification, as well as components, such as engines, EO sensors and fire control systems, with India becoming the second international customer of the AH-64E (Block III) after Taiwan.

The Chinooks will replace India's ageing Mi-26 fleet. Given that the clearance process will require a few more months, it is unlikely that both deals will be signed by the end of this financial year, according to an MoD official.

The Indian Army operates around 250 light helicopters and has, until now, seen its attack and medium-lift types fall under the control of the Indian Air Force (IAF).

Last year, Defence Minister A K Anthony referred to the IAF's unwillingness to give up control to the army a 'family problem'. Retired IAF ACM N A K Browne has since rejected the army's suggestion to operate all the helicopters. He questioned the 'duplication of assets', and noted: 'We cannot afford to have our own little air forces.'

However, a decision was made to allow the army to operate attack helicopters, with service leaders insisting the move would give land forces greater tactical 'power and reach'.

The army has now drawn up plans for its aviation corps that includes a mix of reconnaissance, utility, tactical support and attack platforms. 'A roadmap is required to

absorb capabilities including logistics and training,' said an army official.

By 2022, the service will set up three strike corps and has set a requirement for an additional 33 Apaches to equip these new units. The yet-to-be-stood-up mountain strike corps may also get an aviation brigade.

The in-service Russian Mi-25/Mi-35s, although army assets, are currently manned, controlled and operated by the IAF.

A BAD START

The start of 2014 proved to be bad news for AgustaWestland and the IAF when India terminated the approximately $750 million deal for 12 AW101 VVIP helicopters following allegations of wrongdoings.

The three AW101s delivered are now 'aircraft on ground', with supply of rotables halted. An IAF maintenance official told *Defence Helicopter* that these examples, which have been flown for only 20 minutes since last February when the deal was frozen, have now been grounded.

The service's fleet of eight Mi-8s is also due to start retirement by end of the year, and while officially there has been no communication on the future plan for the replacement of the ageing late-1960s vintage rotorcraft, the Mi-17V5, which India already has on order, is one alternative being considered.

The likelihood of a legal battle in the offing will likely sour relations further, as India has encashed a $32.5 million bank guarantee provided by AgustaWestland and is considering legal proceedings in Italy for another bank guarantee of $325.5 million.

India had paid around 45% of the contracted amount in advance. The OEM's requests made to India's MoD invoking the contractual provision for bilateral discussions went unanswered last year, according to a company statement.

The country's frantic attempt to look clean in its business dealings – especially with national elections to be held in May – is affecting all procurements, with decisions in deep-freeze for fear of reprisals by opposing political parties.

COUNTRY CREDIBILITY

India's credibility in the global market continues to suffer. For instance, the twice-bid 197-aircraft Reconnaissance and Surveillance Helicopter (RSH) requirement for the Indian Army and Air Force to replace 230 ageing Chetaks (Aérospatiale SA 316 Alouette IIIs) and Cheetahs (SA 315B Lamas) is also now in danger of being cancelled.

The NH90 is competing with the Sikorsky S-70B to replace the Indian Navy's ageing Westland Sea King fleet.

The major reason cited is that an army officer was allegedly involved in wrongdoings during the flight trials evaluation process for the finalists – the Kamov Ka-226T and Eurocopter AS550 C3.

The official stance is that the bids have been referred to an oversight committee formed by the army. 'The committee will further analyse the efficacy of the ultimate analysis… we would like it to happen [soon],' Lt Gen Amarjeet Singh Chabbewal, Chief of Staff, Western Command, Indian Army, said with some hope.

'Replacement is overdue… the present fleet inducted in the 1970s has aged and rotables are expensive and not easily available,' said a senior army aviation official.

'We have neglected the sustenance of fleet… [this is] important as wear and tear of helicopters is extremely high,' added Chabbewal.

In 2007, the AS550 C3 had emerged as the winner against the Bell 407. Complaints from Bell stalled the bid, and subsequently the company did not participate in the rebid in 2008, citing an inability to honour the 50% offset requirement. If the tender is scrapped this time, it is likely the OEM will participate.

'We have completed all the steps and are eagerly awaiting the decision,' said Xavier Hay, CEO of the Indian subsidiary of Airbus Helicopters, formerly Eurocopter. 'The operators need it as they will face problems to support the Chetak and Cheetah fleet.'

Airbus Helicopters has been supporting these machines for 50 years, and is concerned that many suppliers in the supply chain have switched to more modern technology.

Spares may face limits by the end of this decade, Hay revealed. He said: 'However, [the long life] also proves the ruggedness of the helicopter.'

> 'The country's frantic attempt to look clean in its business dealings is affecting all procurements.'

DOMESTIC DEVELOPMENT

Meanwhile, in an attempt to encourage indigenisation, government-owned defence manufacturer Hindustan Aeronautics (HAL) has been awarded a contract for an additional 187 Light Utility Helicopters (LUHs), still under development.

HAL's delayed 3t single-engine LUH – which is heavier than the Fennec, with a projected speed of up to 120kt and a service ceiling of 21,300ft – will likely get its initial operational clearance in 2017, a company official said. While the manufacturer has selected the Turbomeca engine for the LUH, the contract has yet to be signed.

'The LUH will have new features like a glass cockpit and composite airframe, M Vijaya Kumar, general manager for rotary-wing research and design at HAL, told *DH*. 'Unlike the Advanced Light Helicopter, [ALH] for which we had sought collaboration with MBB in Germany, the LUH is our own.'

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HAL's enthusiasm for providing all assets to the military – despite its obvious shortcomings manifested in delays across every project the services undertake – could prove responsible for the official cancellation of the RSH should it be announced, a private industry official said.

There is some speculation that due to the 'misdeeds' pointed out in the RSH competition – and the subsequent delays to that project – HAL may be appointed to take over production for the complete requirement (ie both the 197 RSHs and the 187 LUHs).

The company, which recently signed a $75 million deal with the Indian MoD for 20 Cheetal helicopters, is also working on the Light Combat Helicopter (LCH) – the first indigenous attack rotorcraft designed and built in India – for use by the IAF and army.

Currently at the second prototype stage, the LCH is expected to be in service in 2015, with 65 aircraft scheduled for delivery. The LCH uses ALH technology, barring a fuselage modified for tandem seating.

AERIAL AUGMENTATION

Meanwhile, the expanding role of the Indian Navy (IN) and an ageing fleet has resulted in the need to augment its helicopter capability.

Looking to replace its legacy aircraft, the IN has been assessing new utility and multirole helicopters.

A decision is pending on the much-delayed 16-aircraft Multi-Role Helicopter (MRH) programme, with the final bidders comprising the NH Industries (NHI) NH90 and Sikorsky S-70B, to replace the navy's ageing Sea King fleet.

> 'The expanding role of the Indian Navy has resulted in the need to augment its helicopter capability.'

The rotorcraft are to meet requirements for ASW and anti-surface warfare as well as secondary roles such as SAR, transport and casevac.

The delay in opening commercial bids was due to complaints by NHI, alleging non-compliance and pointing out irregularities in the field evaluation trials.

'Whenever a company is about to get a contract, the competitor raises an alarm,' then Chief of Naval Staff Nirmal Verma stated at the time.

An RfI for 123 navy MRHs in the 9-12.5t class – the largest requirement for naval helicopters – has yet to be released, possibly due to lack of funds. The request had indicated that the helicopter could be assigned to missions related to anti-surface warfare, logistics, SAR, amphibious and commando operations. The navy also needs the MRH for an expansion of roles, including patrolling from the Gulf of Aden to the Malacca Straits.

Expected to serve for 30 years, the MRH needs to have the capacity for 10% weight growth throughout its service life without impairing performance. The helicopters must also be able to fit in shipboard hangars with a length of 15.5m, width of 5.5m and a height of 5.3m.

FURTHER BIDDING

The Indian Navy is seeking 56 Naval Utility Helicopters (NUHs) in the 4.5t class to replace its ageing fleet of HAL Chetaks. Of the 85 the navy received up to 2002, approximately 60 remain in service. In addition, the coast guard operates 17 – all are unable to undertake ship-borne ASW.

The NUH bid requires a four-seat, twin-engine helicopter (for two pilots and one assistant/winch operator) with foldable rotor blades and an MTOW that does not exceed 4.5t.

It calls for a range of 370km with a maximum payload of 500kg – offensive capability for ASW should include a light torpedo or depth charge and a mount for 12.7mm machine guns or two rocket launchers on either side, to be supplied by the lead integrator.

AgustaWestland, Airbus Helicopters, Bell, Boeing, HAL, Kamov and Sikorsky are contenders for the bid. The navy's hopes that the helicopters would enter service in 2016 will probably be dashed, as the project is already running a year late.

The coast guard, meanwhile, has a requirement for 14 Twin-Engined Heavy Helicopters (TEHHs) that will be optimised for both SAR and combat operations.

The navy has been on the lookout for an upgrade partner for its existing fleet of Sea Kings since 2008, when a proposal to use Israeli companies was opposed by AgustaWestland. The IN is also viewing upgrades for six Kamov Ka-25s being equipped with the indigenous SV-2000 radar.

Sustained terror-related homeland security threats are also creating a requirement for surveillance and SAR helicopters.

Around 40% of India's large, diverse landmass faces regular violent threats by Naxalite or Maoist radical groups, controlling large portions of remote and densely forested areas known as the 'Red Corridor'. External security threats from neighbouring countries, has also accentuated the need for helicopters by state police departments. *DH*

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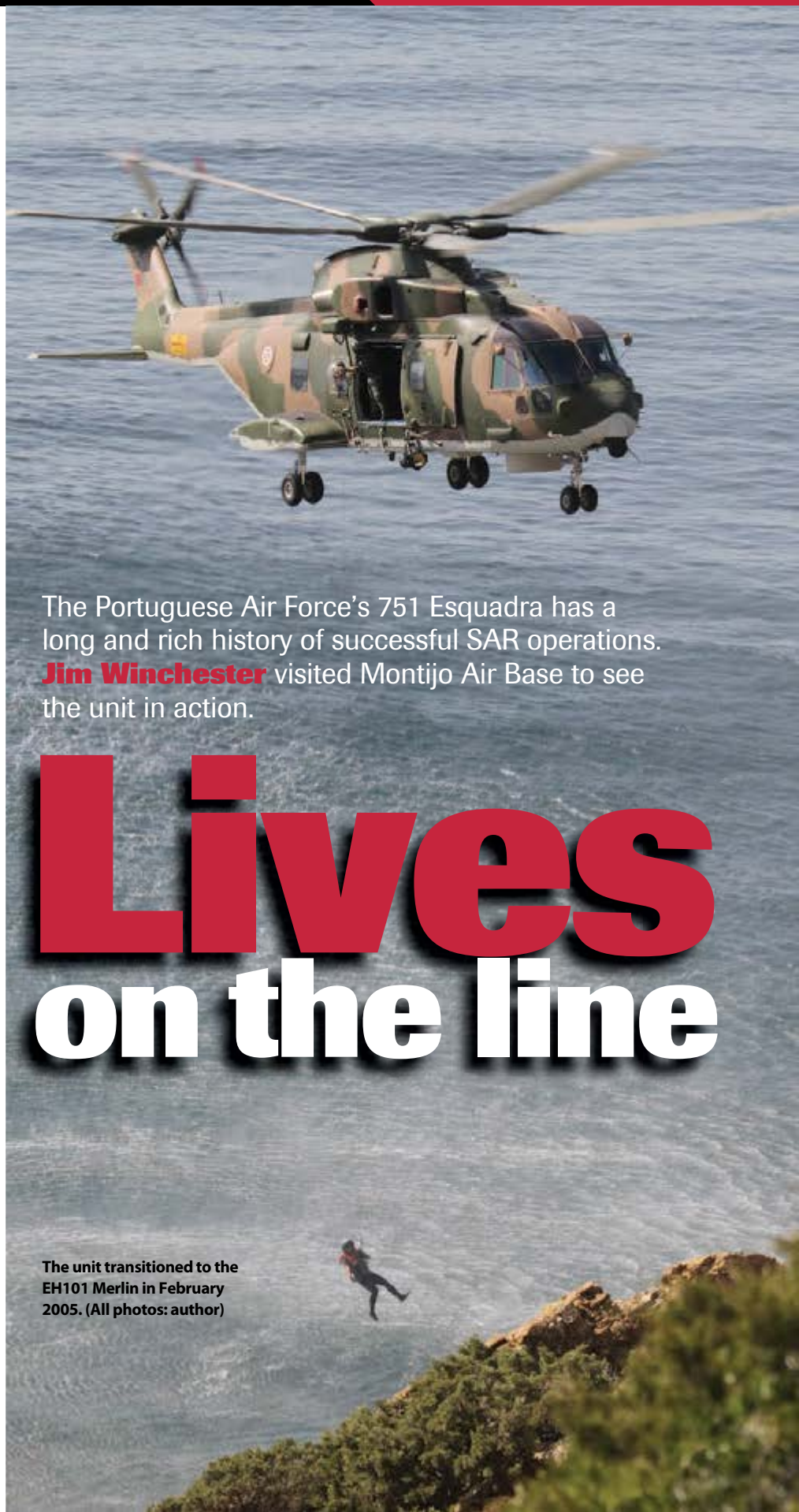

The Portuguese Air Force's 751 Esquadra has a long and rich history of successful SAR operations. **Jim Winchester** visited Montijo Air Base to see the unit in action.

Lives on the line

Located at three bases and covering one of the largest rescue regions in the world, the Portuguese Air Force's (FAP's) 751 Esquadra (751 Esq) was formed in 1978 with radar-equipped SA 330 Pumas.

Tasked with providing SAR coverage over almost a third of the North Atlantic, 751 Esq has saved almost 3,000 lives over the past 35 years, having adopted the nickname 'Puma' and the motto 'para que outros vivam' (so that others may live).

The collection of life preservers and flotation aids that fills the Pumas' crew room at Montijo Air Base, near Lisbon, attests to the many successful missions. Notable rescues include 15 crewmen from the *Angel del Mar*, and 17 from the *Bolman III* in 1994.

On 24 December 2000, 22 were saved from the *Coral Bulker*, which ran aground in northern Portugal – the biggest single rescue to date.

SEA CHANGE

The unit transitioned to the EH101 (now AW101) Merlin in February 2005, retaining the Puma nickname and continuing the tradition of daring maritime exploits, including the rescue of five crew from the MV *Kea* off Galicia, Spain, in March 2010, which resulted in the crew being decorated by the Spanish authorities. Another included six fishermen from the *Virgem do Sameiro* rescued in December 2011, who had spent 57 hours in a life raft.

In February 2013, 751 Esq saved capsized Portuguese Vendée Globe race yachtsman Javier Sansó at a record distance of 670km from the Azores. To achieve this extreme range, the Merlin was filled with 5,000kg of fuel and stripped of all unnecessary equipment.

With the six standard aircraft – manufacturer's designation AW101 Mk 514 – the squadron's primary missions are SAR, emergency medevac and tactical air transport. In the latter role, the Merlin can carry up to 35 troops or 16 stretchers.

The Portuguese Army has a requirement for NH90s, but until an order is signed, the Merlin is the country's only tactical transport helicopter, supporting ground forces as well as undertaking government tasks such as VIP transport – the type carried Pope John Paul II on his three visits to Portugal.

Two Mk 515 aircraft are assigned to the fisheries protection (Sistema de Fiscalizacion de Pescas (SIFICAP)) mission and are fitted

The unit transitioned to the EH101 Merlin in February 2005. (All photos: author)

with external loudspeakers. In the cabin, there are modular stations for a radar operator and a loudspeaker operator in this role.

IN COMBAT

Four Mk 516 Merlins are dedicated to CSAR, with tail folding and extra countermeasures including chaff and flare dispensers. Up to three general-purpose machine guns can be fitted, as can ceramic armour plates. Both the CSAR and SIFICAP aircraft can be used on SAR missions, while the SAR rotorcraft can be re-roled for CSAR, albeit without tail folding.

The intent had been to deploy the CSAR Merlins on a planned Portuguese Navy amphibious ship, but this fell foul of budget cuts. Probes were acquired for inflight refuelling, but are seldom if ever fitted, not least because the FAP has no tankers.

Hover inflight refuelling can be employed to allow a long-range CSAR mission to be staged via a navy ship. Normal range is 570km, but with ferry tanks this can be stretched to 730km. The Merlin has more than twice the mission radius of the Puma.

All the Merlins are fitted with Nightsun searchlights, which restrict their maximum speed to 150kt. Further limits include 100kt with the doors open and 120 with the ramp partly down. Other mission equipment includes the FLIR Systems Star Safire II EO/IR sensor and Selex ES radar with a maximum range of around 300km.

The squadron's area of responsibility is about six million square kilometres. Missions are tasked by rescue coordination centres (RCCs) at Lisbon and Lajes in the Azores, maritime RCCs at Lisbon and Ponta Delgado and a maritime rescue sub-centre at Funchal.

One Merlin crew is on 24-hour, 365-day standby at Montijo and at Porto Santo in Madeira, with two crews at Lajes. At Montijo and Lajes, the stated response time is 30 minutes by day and 45 minutes by night, and 45 minutes and 60 minutes respectively at Porto Santo.

The crew on SAR missions usually consists of a pilot, who is the aircraft commander, a first officer/co-pilot, a systems operator/winchman, a rescue swimmer and a flight nurse. A civilian medical team can be embarked if needed.

UP TO THE CHALLENGE?

A typical SAR training mission, as observed by *Defence Helicopter* on a recent visit, lasts up to three hours and tests the crew across a number of challenging scenarios. The first is to go out over the Atlantic and hail merchant ships for winch training.

Although not every captain wants to take part, there is plenty of traffic in this busy shipping lane that heads northwards towards the English Channel, and a cooperative tanker or freighter can usually be found. The ship maintains its speed and course as the Merlin keeps pace, lowering the rescue swimmer and a stretcher for several simulated rescues.

The next stop is Cabo Espichel, south of Lisbon on the Atlantic coast, for cliff rescue practice before heading back out to sea where the rescue training dummy is lowered into the water, then a buoy is dropped to mark its position.

When a Merlin returns to Montijo, it is hosed down to remove salt picked up from the rotor wash.

The dummy and buoy are recovered aboard by the swimmer and winchman onto a tray lined with absorbent material to protect the structure from the effects of salt water. When the Merlin returns to Montijo, it is hosed down to remove salt picked up from the rotor wash. The manufacturer has modified the Portuguese examples with extra drains in the tail area to reduce salt water pooling. The same training mission is also flown at night using NVGs.

Budget difficulties in Portugal, one of the countries hardest hit by the Eurozone financial crisis, led to a reduction in annual flying hours across all FAP fleets by about 500 hours on average.

The SAR helicopter fleet was less savagely hit, with hours reduced from 2,000 to 1,730, mostly in training time – about 55% of hours flown are still spent on training. The reductions have not lowered the required crew qualifications for SAR or the missions themselves.

FLIGHT TIME

In 2011, 608 hours were flown on SAR missions, with 173 people rescued. In 2012, 157 lives were saved across 430 flight hours, and a further 116 hours were flown on SIFICAP missions.

Initial Merlin operations from 2004 were hampered by a lack of trained crews and poor aircraft availability, requiring the FAP to briefly re-introduce the SA 330. A support agreement with AgustaWestland was signed in 2008 and this full in-service support scheme (FISS) has since greatly improved availability.

Required serviceability is now approximately 97% for the single Porto Santo aircraft, 96% for the two in the Azores, and 70% across the five at Montijo.

FISS looks to accomplish the operator's aims of ensuring airworthiness, achieving the required flying programme and guaranteeing the desired outputs of the fleet for the Portuguese MoD through an integrated team of customer, operator and industry, including AgustaWestland and local suppliers.

To this end, the Joint Aircraft Availability Management Office (JAAMO) located in 751 Esq's hangar at Montijo employs 23 technicians and eight managers and office staff, a mixture of FAP, AgustaWestland and OGMA (Portuguese MRO) personnel.

The JAAMO is the local version of AgustaWestland's fleet operations centre at Yeovil in the UK. It lacks the 'mission control'

The CSAR and fisheries protection aircraft can be used on SAR missions, while the SAR aircraft (pictured) can also be re-roled for CSAR.

layout of that facility, but works in the same way, constantly monitoring aircraft usage, overhauls and technical support requirements and coordinating all the information about the aircraft with AgustaWestland in the UK and Italy, as well as the FAP, according to the company's full in-service support manager Nick Green.

With this information, the JAAMO implements the fleet plans agreed by all parties to achieve the required operational outputs.

The squadron conducts first-level maintenance and clears the aircraft for flight. AgustaWestland and OGMA conduct second-level or in-depth maintenance, which on an FAP Merlin is scheduled every six months or 150 flying hours. As of September 2013, the fleet had flown between 802 and 1,595 hours for a total of 16,291 hours.

Both types of maintenance source spare parts from the FISS warehouse at Montijo. The Portuguese Navy's Lynx squadron, which is based just over the road, but is not under a full-service contract, is known to call up the JAAMO requesting common spares.

AVAILABLE AIRCRAFT

At the time of *DH*'s visit, six Merlins were available across the three bases – one was under unit maintenance and three were being worked on by the JAAMO, but two were handed back to the unit the same day.

Another two were unserviceable and awaiting their turn, at least one of them for engines, the availability of which has been a problem for the Montijo operation.

The FISS excludes the Merlin's RTM322 engines, which are repaired in France by Turbomeca.

The FISS contract guarantees a date for each aircraft's in-depth servicing to be completed, but delays in completing and returning overhauled engines have left the JAAMO with otherwise serviceable aircraft that cannot be test flown.

In early September 2013, Turbomeca's joint venture with Rolls-Royce was ended with the former's acquisition of the UK company's 50% stake in the RTM322, and Turbomeca has promised to improve customer service and turnaround time for the FAP.

As of the end of 2013, 751 Esq had saved 2,933 lives, approximately 1,100 of them with the Merlin.

'We [the JAAMO] go beyond the FISS boundaries very often to help the squadron achieve what it needs to,' said Green. 'We are very much an integrated part of the squadron, so when we see the successful missions that the air force achieve,we feel the same satisfaction.' ***DH***

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The Italian Air Force has been actively updating its SAR helicopter inventory following the fatal crash of an HH-3F in 2008. **Mauro Finati** and **Paolo Rollino** provide an overview of the upcoming changes.

Waiting in the wings

On 23 October 2008, while flying over France to join a tactical leadership exercise, an Italian Air Force (Aeronautica Militare Italiana (AMI)) HH-3F helicopter (MM80981/15-10) suffered a devastating inflight failure of the main rotor, resulting in a crash with the loss of eight lives.

The episode dramatically brought the state of the air force's rotary-wing fleet – in particular the HH-3F Pelican, which had been in service with the 15th SAR/CSAR Wing for almost 30 years – to the attention of the Italian government.

The helicopter was introduced into service in two separate batches, all produced in Italy by Agusta at Vergiate. The first series of 20 aircraft was delivered between 1977 and 1982, with a second of 15 between 1991 and 1992. The latter batch was directly produced to 'Bravo' standard, optimised for the CSAR role, and the former were gradually updated to the same standard during major overhauls.

The HH-3F Pelican has been in service with the 15th SAR/CSAR Wing for almost 30 years. (All photos: authors)

The AW139 (HH-139A) and AW101 (HH-101) were chosen as replacement aircraft.

ADOPTION ROUTE

As a result of the tragic accident, some modifications were introduced during the servicing of the machines. However, the progressive withdrawal of the type from the fleet was also planned, with the adoption of new helicopters and a reorganisation of the AMI's entire CSAR/SAR structure.

The AgustaWestland AW139 (HH-139A) and AW101 (HH-101) were chosen as the replacement aircraft, and at the end of 2010 a contract was signed for the purchase of ten of the former, with three more on option. A total of 12 AW101s are also being acquired, with a potential option for three more.

The 15th Wing has a complex structure, with flying units spread across Italy, covering most of its territory.

From October 2010, the control unit was transferred from Pratica di Mare (Rome) to Cervia (Ravenna). The 15th Wing's command and the main support and logistic structures are located here, together with the rotary-wing fleet's major overhaul centre.

Among the flying units is the 81st Crew Training Centre (81° Centro Addestramento Equipaggi (CAE)), currently equipped with a single TH-500B (NH-500E), two HH-212As (AB 212Es) and four HH-139As. It is in charge of training personnel, pilots, onboard operators and air rescuemen.

The operational unit at Cervia is the 83° Gruppo CSAR (83rd CSAR Group), which has three HH-3Fs. It is in the transition phase to the HH-139A and, by year-end, will start receiving the new helicopter from the CAE.

SAR CENTRES

The other flying units subordinate to the wing include: the 82nd SAR Centre at Trapani-Birgi with three HH-139As; the 84th SAR Centre at Gioia del Colle, also with three AW139As; and the 85th SAR Centre at Pratica di Mare, which operates the remaining HH-3F Pelicans, although it is awaiting new machines under option.

Each SAR centre will then operate a fleet of three HH-139As, while only one will remain with the CAE for training duties. Each SAR centre also has a single TH-500B available for liaison tasks, except for the

84th at Gioia del Colle AB, which has two examples.

The HH-101 Caesar, meanwhile, will be a specially equipped version for CSAR and special operations missions, with advanced avionics, active and passive self-protection systems, onboard armament, more powerful engines and an inflight refuelling probe.

The HH-101s will be optimised for high-precision, long-range and low-level navigation in close contact with the ground to take advantage of the terrain.

The first of 12 machines on order is expected to be assigned to a unit at the end of 2014 – or beginning of 2015 – and the last one three years later.

It is not yet clear which unit will be assigned these machines first. However, it is likely that some will equip the 21st Gruppo at Grazzanise, which is still flying HH-212s in the CSAR role.

The 15th Wing provides SAR missions for flight crews in distress 24 hours a day, 365 days a year, over land and sea. The unit also contributes to such public benefit activities as emergency medical transportation.

From its inception to the present day, the crews of the 15th Wing have saved around 7,000 people. In addition, its helicopters often respond to natural disasters under the control of Italy's civil protection agency.

Regarding military activities, the wing has deployed machines and crews abroad many times, most of these as part international missions, such as the detachment of four HH-3Fs to Cyprus during the hijacking of the ship *Achille Lauro*, Operations *Restore Hope* and *Albatross* in Somalia as well as *Antica Babilonia* in Iraq.

NEW COURSE

The arrival of the first HH-139A at Cervia in January 2012 marked the beginning of a new chapter for the 15th Wing and the start of the modernisation of the AMI's helicopter fleet.

The HH-139A is based on the AW139M, which is the 'militarised' version of the now ubiquitous medium-size AgustaWestland helicopter, with over 600 examples produced to date. As such, it is not a machine specifically developed for military use, but represents an adaptation. In fact, it was acquired by the air force as an 'interim' solution because the final platform is intended to be a mission-specific version of the new multirole AW149, currently under development.

The AW149 programme was launched in 2006 and there are four prototypes and two machines in pre-production configuration, with a total of 2,000 flight hours performed to date.

The multipurpose helicopter is capable of performing transport missions, tactical SAR/CSAR, special operations and close air support. It can carry 18 equipped soldiers (or six stretchers in standard NATO configuration) with a payload of 3t.

The AW149 is currently being offered by Polish company PZL-Swidnik against a Polish MoD requirement, which also foresees CSAR missions.

The Italian Army is interested in this model for the replacement of its of AB 212s and

The HH-139A is based on the AW139M, the militarised version of the ubiquitous medium-sized helicopter.

AB 412s. However, the acquisition schedule for the SAR variants will depend on available economic resources.

PROVEN PERFORMANCE

In any case, the AW139 is a highly regarded solution for SAR activities due to its proven reliability and flight performance. In a typical configuration, the helicopter has a crew of two pilots, an onboard operator and a single air rescueman, and can accommodate a maximum of three passengers.

In transport configuration, the helicopter has a maximum capacity of 14 passengers, or for medevac missions can be equipped with four stretchers. The HH-139A can support a maximum cruise speed of 160kt, with low vibration levels. Endurance is around 2.5 hours, which can be extended by 30 minutes using an internal auxiliary tank.

With an MTOW of 6.4t (4.5t empty weight), the helicopter has a power/weight ratio that allows safe use even in operations at high altitude in mountainous terrain. The HH-139A is powered by a reliable pair of Pratt & Whitney Canada PT6C-67C turboshafts, rated at 1,679shp each.

In comparison, the Pelican's T58-GE-5 engines can offer only 1,521shp against an MTOW of 10t (6.2t empty). On the other hand, the HH-3F can offer greater internal space and an endurance of up to 5 hours, albeit with a lower cruising speed. The standard crew of the Pelican consists of two pilots, two operators and one air rescueman.

The new HH-139 helicopter represents the transition from an analogue technology to a fully digital machine. The new aircraft is equipped with an integrated NVG-compatible glass cockpit featuring 8×10in displays, with advanced graphics capabilities and cursor control devices.

The cockpit also features a four-axis digital automatic flight control system with SAR modes and flight management system SAR patterns, weather/search radar, TCAS II, a nose-mounted advanced FLIR, health and usage monitoring system, digital video recorder, video downlink, moving map on flat display, auto-deployable emergency locator transmitter and enhanced ground proximity warning system, as well as a secure communications suite.

The aircraft also features an integrated defensive aids suite, hoist, searchlight, wire cutters, loudspeaker system and emergency flotation gear.

For the CSAR role, the HH-139A can be equipped with an external stores system for 70mm unguided rocket pods.

Navigation information can now be viewed on the five screens within the MFD cockpit, rather than dispersed across a multitude of panels. A central monitor is connected to the GPS data to complete navigation and directly shows the location on a map.

In addition, full night operations are possible through a latest generation Star Safire III from FLIR Systems equipped with HD camcorder and tracking function, a searchlight from six million candles and full compatibility with NVGs.

The AMI aircraft have also been fitted with new heavy-duty reinforced raised landing gear to allow landings on rough and steep terrain.

Unlike the HH-3F, the HH-139 does not possess amphibious characteristics, but can operate in the hover at a minimum altitude of 15ft above water.

The FLIR camera, controlled by the second pilot and the operator in the cabin, can be used for terrain control and target monitoring and allows night-time recording.

These helicopters also have a ventral cargo hook for payloads of up to 2,200kg, and are equipped with an external winch capable of lifting loads of up to 270kg using an 80m-long cable.

The introduction into service of the HH-139A was carried out with the full assistance of AgustaWestland, which initially made a standard AW139 available at Cervia for a period of 1,000 flight hours, ensuring a fast transition for a number of crews.

The theoretical training of personnel is carried out at the company's academy in Sesto Calende, where pilots also perform flying activities with the simulator.

TRAINING RESPONSIBILITIES

Operational training is carried out by the 81st CAE. Specific procedures for SAR HH-139A were developed by the 15th Wing with the assistance of the Reparto Sperimentale Volo staff at Pratica di Mare. The CAE is also responsible for SAR training of aircrew within other Italian parapublic units, such as the Coast Guard, State Police and Carabinieri.

The 15th Wing was founded in 1931 on the eve of a troubled and dramatic period for Italy and the whole world. The unit therefore prides itself on its warrior traditions, but also its humanitarian missions.

In the words of one 15th Wing SAR pilot: 'Air rescue is an extraordinary discipline that pays only with the grateful and pleased look of people who, having believed to have come to an end, thanks to our work can have a second chance.' ***DH***

The HH-3F offers a spacious interior and an endurance of up to 5 hours.

Kingdom of Saudi Arabia is estimated to have the fourth largest defence budget in the world following USA, China and Russia valued at USD $ 52.9 billion in the 2013 andKingdom of Saudi Arabia's is at the 7th position among the top 10 countries when it comes to the defence expenditure

Nispana Innovative Platforms as a company has identified that the Defence Summit is an Exclusive Gathering for Key stakeholders and Global Suppliers in the booming defence sector and is hosting it on the 15th -17th April 2014 at the Radisson Blu Hotel in Riyadh, Saudi Arabia.

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Transmission control

Voice and data communications are a vital aspect of plugging helicopters into the modern networked battlespace. **Jonathan Tringham** looks at the latest technologies for connecting airborne assets to other force elements.

In order to gain air and ground superiority, armed forces must have the ability to simultaneously deploy a range of fixed- and rotary-wing platforms in coordination with land-based assets.

Such coordination requires these assets to be equipped with high-quality, reliable, interoperable and integrated communications, navigation and identification (CNI) systems.

Richard Gascoin, radio communications products marketing manager for Thales, explained that the company had spent years focusing on the development of fully integrated CNI systems for fixed-wing aircraft and helicopters, as well as ground-to-air networks for communications between command centres and aircraft in the theatre of operations.

'Our CNI suites include communications, covering plain and secure voice, tactical data links – for example Link 16 or LX16 which is our export equivalent – and a new SATCOM terminal specifically developed for helicopters,' he told *Defence Helicopter*.

'Because we manufacture all the equipment, functions and system infrastructure for the ground, we can guarantee interoperability between air, navy and land forces, especially in the form of communication and identification.'

According to the company, its CNI equipment and systems are designed to meet current civil and military standards, including those for NATO and national tactical data links or high-rate data links for reconnaissance, SATCOM and communications intelligence, and are currently installed on the NH90, Tiger, Apache, Dauphin/Panther, Cougar and Fennec military helicopters.

NEW WAVE

Thales has also developed NextW@ve, the latest evolution of its V/UHF radio family utilised on board the Apache, NH90, Panther, Lynx and Caracal.

Effective communication between ground forces and helicopters is key to success in the 21st century battlespace. (Photos: US DoD)

'We have extended the frequency range and included a high-data-rate capacity inside the radio, and with that we can support tactical data links or specific data links to transfer video or images. Throughput is now around 250kb/s, and we are working towards achieving a throughput rate of 750kb/s,' said Gascoin.

TopLink is another new system, designed in-house specifically for helicopters, which provides a small aircraft with a light tactical data link system in the form of Link 16, supported by NextW@ve radio.

'It's a very compact solution with a processor, and a very simple and light man-machine interface. The interface is like a pad that could be fitted in the cockpit, but it could also be fitted on the leg of the pilot, so it's small with all the indicators for a tactical situation – reports, orders and so on,' Gascoin explained.

'The multi-mode receiver is packed in a single box, and has several navigation functions for en-route navigation and landing. The components were previously housed in separate boxes, however they have now been integrated into a single unit.'

TIGER TALES

Thales furnishes the CNI system used on board the Eurocopter Tiger attack helicopter fielded by the French, German, Spanish and Australian armed forces.

'For each customer of the Tiger, there is a specific configuration, so the German, French, Australian and Spanish Tigers will all have different installations tailored to their requirements,' said Gascoin.

CNI components and systems from different manufacturers can be incorporated onto the platform, but as the main customers of the Tiger are from NATO environments, they generally need to have the same functionality.

The radio systems on board the Tiger are all encrypted to NATO (COMSEC) standards, and incorporate the entire relevant V/UHF spectrum (tactical VHF, air traffic control VHF, maritime VHF and military UHF), including voice and data services.

According to the company, two tactical VHF channels of the communications suite are fully integrated into the Tiger's mission system 'to provide the data and voice services specifically needed inside the patrol, and for integration into voice/data communications networks deployed on the battlefield'.

Integrated comms/nav packages can significantly reduce crew workload in forward landing zones.

Tiger aircrews use an all-digital secure intercom system called TopSIS, which manages and integrates audio signals, internal and external data and voice on board for secure communications.

The platform utilises a Thales TACAN transponder and multi-mode receiver for in-flight navigation and landing, and a BlueGate IFF transponder compliant with civil, NATO or national secure modes for in-theatre identification. The IFF is upgradable and will soon integrate Mode 5, the new NATO secure mode.

AGE CONCERN

Meanwhile in the UK, one challenge presented by the advancements made in communications technology is to ensure older helicopters can be effectively integrated and deployed with newer platforms. To achieve this, legacy aircraft are being fitted with glass cockpits and integrated CNI suites.

The AW159 Wildcat is due to enter service with the British Army in 2014, and the RN by 2015. Slated for use as a battlefield utility, SAR and ASW helicopter, it is also equipped with the Bowman tactical communication system, giving it targeting and secure voice communications capabilities. The RAF's 24 Mk 2 Pumas are being fitted with a new secure communications and navigation suite developed by Rockwell Collins as part of a fleet-wide upgrade (see also p8).

The UK MoD coordinates its rotary- and fixed-wing aircraft with land and naval assets via the Bowman system. The contract for the programme, which currently provides secure tactical communications across the MoD's combat helicopter fleet, was originally awarded to General Dynamics UK (GDUK) for £1.9 billion ($3.1 billion) in 2001.

The system is installed on all UK military helicopters tasked with supporting land operations, including the Apache, Chinook, Merlin and Lynx, as well as the entire RN fleet and more than 15,000 land vehicles.

Despite some inherent limitations of the system due to ageing components, resulting in a comparatively limited bandwidth capability by current standards, Bowman is expected to have an operational lifespan extending to 2026.

Under the provisions of the original contract, GDUK was required to provide British forces with secure voice communications, secure messaging, local area subsystems, user data terminals, automatic position location, navigation and reporting facilities, battle management functions, system communication and cryptographic management, as well as conversion and training.

The resulting network utilised an array of HF, VHF and UHF radio sets and ancillaries to provide secure integrated voice and data services to dismounted soldiers, individual vehicles and command headquarters, up to the divisional level in the battlefield.

At the time, Bowman was set to be installed on an estimated 22,000 ground vehicles of 181 different types, 133 naval vessels of 20 types and 230 aircraft of four types. This number was subsequently revised down to 15,500 vehicles plus fixed HQ buildings, and 70 aircraft of two types, with an in-service date

of December 2004, and an operational readiness date of mid-2005.

APACHE CAPABILITY

In 2003, the contract parameters were extended to include the Apache Bowman Connectivity (ABC) programme, at an additional cost of £29 million.

According to GDUK, ABC was designed to provide 'secure voice and data communications between the British Army's attack helicopter and its related land-based operational units', without the need for cockpit or mission system modifications.

This was achieved by 'adapting some of the Bowman network access units to provide an integrated communications network with previously under-utilised facilities within the airborne weapons platform'.

ABC utilised a modified Bowman Network Access Unit (BNAU), incorporating a single-card improved data modem (SCIDM), developed by GDUK in partnership with Innovative Concepts.

The SCIDM hosts VMF and AFAPD message protocols, so it can receive data reports transmitted from the Apache via its modem and secure ARC-201D SINCGARS radio, operating in 'non-hopping' mode.

The messages are transmitted to an ABC gateway vehicle – within a 25km radius – fitted with KY-99 appliqué crypto and a Bowman VHF radio (also set to 'non-hopping' mode) and an SCIDM-equipped BNAU. The Apache message is then re-transmitted via a second Bowman radio into the system's tactical internet.

CUTTING BLADES

Elsewhere, with the increasing availability of advanced satellite constellations offering ubiquitous coverage and reliably high data rates, manufacturers of communications systems are seeing an uptick in demand for SATCOM solutions for helicopters.

However, until recently the disruptive effect of the main rotor blades on satellite signals has hampered efforts to effectively utilise this technology.

In March 2013, Washington-based Hughes Network Systems cracked this particular puzzle, and demonstrated the loss-free transmission of high-throughput data and video over a SATCOM terminal installed under the main rotor blades of a helicopter.

According to the company, during a series of tests with military and commercial helicopters, its new communications-on-the-move (COTM) system 'consistently transmitted full-motion video beyond line of sight through the aircraft's rotors in both static and in-flight environments'.

The COTM microstat system utilises an advanced waveform technology developed internally to 'achieve zero packet loss on transmission and reception through rotor blades, over both Ka- and Ku-band satellite channels', a Hughes representative said in a written statement.

Meanwhile in Europe, Pascal Augier, SATCOM segment manager for Thales, told *DH* his company had developed a new offering for

SATCOM, called Antares-H, which was also capable of transmitting high rates of data through a helicopter's rotors.

'The way some of our competitors are doing this is with some kind of synchronisation of burst transmission, but we don't do that,' said Augier.

He explained that Antares-H was a derivative of the Antares terminal that has been dedicated to helicopters, UAVs and large mission aircraft.

According to Augier, the anti-jamming capabilities built into the modem of the system had the unintended but useful side-effect of conferring an inherent ability to transmit data through the rotors of a helicopter without interruption.

'It is quite unusual to have the possibility to install the [SATCOM] terminal on the top of the main rotor, which means it must be placed more or less below the main rotor. [In this configuration] the blades will obstruct the availability to the satellite and it has a huge impact in terms of the data rate that is achievable,' he said.

Thales' Antares-H uses a side-effect of its anti-jamming capability to transmit data through turning main rotor blades. (Photo: Thales)

'Antares-H uses a frequency-hopping modem, and so from time to time during jamming you will have some elementary "outs" that will be jammed, but this will have no impact on the [transmission] overall. What we found was that when the blades of the helicopter's rotor blocked the signal to the satellite, the modem treated it as though it were a jamming, and was inherently capable of overcoming the signal block by virtue of its anti-jamming capabilities. It's an anti-jam modem that is also able to transmit and receive through the blade very easily, and basically at full capacity.'

According to Augier, Antares-H was developed to take advantage of the new satellite resources that are becoming available in the Ka-band, offering worldwide coverage with very high data rates.

'This is a pretty new offer – the reason for this is that [until now] there was no real market for this kind of system in Europe. Most of the market was in the United States, and not really accessible to us,' he said. 'This data capability is of more interest now because you have the ability to achieve data rates in the realms of megabytes per second over very long distances.

'Basically, we felt the need for some countries to maybe own for themselves the satellite resources, but available more as a commercial business. An analogy would be mobile telephone networks, where you pay for the communication, but the terminals themselves are not expensive.' ***DH***

Stock in trade

As Western defence budgets continue to stagnate, helicopter OEMs are looking to other regions to keep their order books in a healthy condition. **Tony Skinner** and **Joyce de Thouars** examine the sales prospects in Asia-Pacific.

The US defence industry was provided with some Christmas cheer when President Obama signed a budget deal on 26 December which eased automatic spending cuts.

Although this softens the short-term impact of sequestration – allowing expenditure to rise by $63 billion over scheduled levels in FY2014 and 2015 – the long-term outlook remains uncertain for contractors that are solely reliant on Pentagon expenditure.

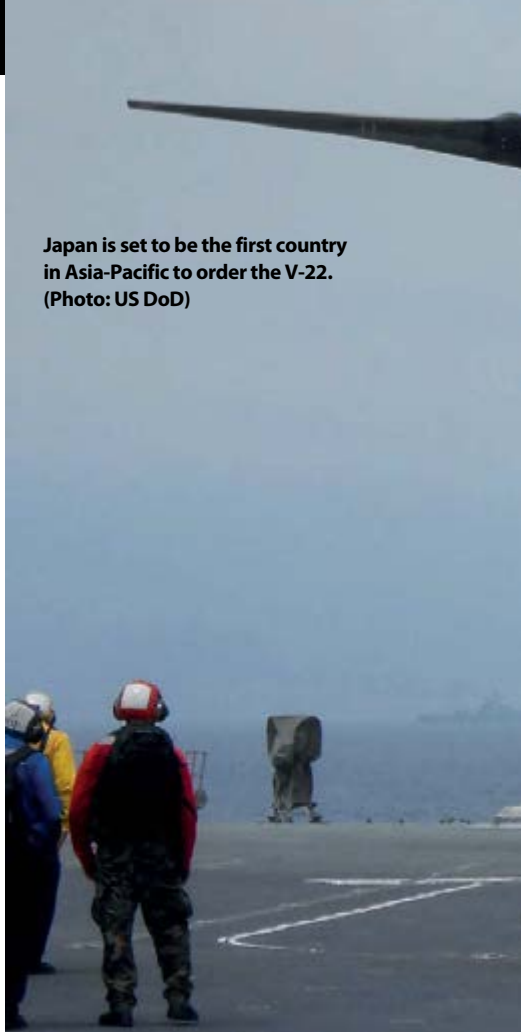
While the prime aerospace and defence companies were able to record positive financial results for 2013 through ongoing cost-cutting measures and reorganisations, executives continue to look for export growth in areas such as the Middle East, Asia and South America.

While this will not be enough to immediately offset the decline in US defence spending, which still accounts for around 40% globally, gaining a foothold in emerging markets around the Asia-Pacific region is seen as essential to weathering the downturn in North America and Europe.

Asia's rapidly increasing geo-strategic importance is demonstrated by the US 'pivot' to the region, as outlined in the strategic guidance released by the DoD in January 2012.

Asian defence spending overtook Europe in 2012 according to the International Institute for Strategic Studies, and long-term growth of military budgets there may be driven further by various political and economic conditions, with continuing or increasing regional tensions fuelling additional procurement.

On the rotorcraft front, Asia is forecast to be the fastest growing military helicopter market, with expected orders amounting to up to 1,000 units by 2020. Airbus Helicopters, for example, expects that tenders there should produce sales worth around $10 billion over this period.



Japan is set to be the first country in Asia-Pacific to order the V-22. (Photo: US DoD)

The largest single market in the region is India, which has a number of large outstanding rotary-wing requirements as the military moves to improve the mobility of its ground forces, which requires the acquisition of large numbers of tactical transport helicopters.

Forecasts suggest that India will comprise 10% of the global market for military helicopters, peaking at 1,000 aircraft for its military and paramilitary forces in the coming decade.

However, recent history has shown that doing business with the Indian MoD is not always straightforward and several procurements have become bogged down in complex bureaucracy (for more detail, see pp13-16).

Nearly 300 Surions have been ordered by the Korean armed forces, and KAI is also targeting export sales. (Photo: *DH*)

CONCERTED EFFORTS

With an eye on such regional needs, aerospace/defence primes, as well as several second-tier suppliers, have been vocal about their efforts to capture more business across Asia-Pacific – with varying degrees of conviction.

Boeing, for example, has now set itself a target of generating around 30% of its defence revenue outside the US in the near term.

The head of the company's defence division, Dennis Muilenburg, revealed last year that in 2012 the company closed at 24% international revenue – up from 7% five years earlier.

'And in the first quarter [of 2013] we were at about 28% so you can see that progress continuing,' he told reporters in June.

In recent years, Boeing has doubled the size of its operations in Australia, where it has been shortlisted for the government's Helicopter Aircrew Training System programme to meet the future rotary-wing training needs of the Australian Defence Force (ADF).

Media reports suggest that Boeing Defence Australia and partner Thales Australia have been selected as preferred tenderers for the programme, but this had not been officially confirmed at the time of writing.

Boeing has also had some recent regional successes with its AH-64E Apache, with a contract awarded for 36 by South Korea and its selection by Indonesia, which plans to buy eight aircraft.

US Defense Secretary Chuck Hagel announced in Jakarta on 26 August an agreement for the $500 million sale of eight AH-64Es with Longbow radars

Speaking at a joint press conference with Indonesian Defence Minister Purnomo Yusgiantoro, Hagel underscored the importance of military cooperation between Washington and Jakarta in order to promote regional stability.

'Progress on security includes increasingly complex exercises between the two militaries, and growing defence, trade and high-level policy engagement,' he said.

Hagel explained the two militaries had recently launched an initiative to share best practices in defence planning and management to increase Indonesian military capability.

Senior defence officials have indicated the US will train Indonesian pilots to deploy the newly acquired Apache in defence of the country's borders, conduct counter-terrorism and counter-piracy operations, and control the flow of shipping through the Strait of Malacca.

Previously, the US had refused to sell military hardware to Indonesia due to reports of human rights abuses in the country. This stance was revised under President George W Bush, whose administration lifted most of the restrictions on trading with the Indonesian military, and by 2010 full rights had been reinstated.

The Indonesian MoD confirmed the country's intention to double its military helicopter strength in March 2012, which also increases the need for training.

Sikorsky announced the sale of two S-300C helicopters with an option for four to IPTN North America, a subsidiary of PT Dirgantara Indonesia in 2012. The helicopters will support the Indonesian Army's requirement to train more than 100 new pilots over the next few years.

NORTH–SOUTH DIVIDE

Meanwhile, on 23 August last year, the Pentagon announced the award of a contract to Boeing for the 36 Apaches for South Korea, with the complete package, including airframes, support, training, spares and additional materials, worth some $1.6 billion to various US suppliers.

Competing against Bell's AH-1Z Cobra and TAI's T129B, the AH-64 was selected as the winner in April and the helicopters are all scheduled for delivery by 2018.

Seoul has previously harboured plans for an indigenous attack helicopter, for which Korea Aerospace Industries (KAI) has proposed a modified version of the Surion platform developed under the Korean Utility Helicopter (KUH) programme. However, these plans now seem to have stalled.

Han Nack Hoon, senior analyst at the Institute of Defence and Strategic Studies at Nanyang Technological University in Singapore, told

Many countries in the region have requirements for new training helicopters. (Photo: Airbus Helicopters)

Defence Helicopter: 'The Apache has been selected for now and any potential indigenous programme will be after that, but that is not going to be in the near future.'

South Korea's long-term Basic Defence Reform Plan 2012-30, released in August 2012, calls for the enhancement of its deterrence, warfighting and intelligence capabilities to address the threat of North Korea, the rising power of China, and military modernisation of key regional powers in general.

Modernisation efforts are aimed at reducing the size of the armed forces while enhancing capabilities. The national defence budget for 2014 has been set at $33 billion. Despite an increase of 4% on last year, it is actually the lowest rise since 2010, when the budget was raised by just 2% following the 2008 financial crisis.

JOINT EFFORT

KAI is jointly developing the Surion with Airbus Helicopters (formerly Eurocopter), in a programme illustrative of the European manufacturer's approach to working in the region.

As a sub-contractor, Airbus provides main rotor components, the main gearbox, boom and tail gearbox, the automatic flight control system and rotor mast. However, the two companies will jointly market the aircraft for export under a joint venture established in 2011.

KAI believes that the partnership will give the aircraft the best opportunity of gaining entry into the market, which it says has 'high barriers to entry', while the JV will also take advantage of Airbus Helicopters' significant marketing infrastructure and expertise.

South Korean defence exports increased to $3.4 billion in 2013, bringing it closer to its target of $4 billion by 2020. KAI sees additional export potential in the Black Hawk upgrade market.

However, the company is currently focusing its energies on pushing forward with the KUH programme and as of 31 October 2013 had already delivered 19 production aircraft.

In total, 245 Surion helicopters have been ordered to replace the ageing UH-1H and MD 500 fleets of the Republic of Korea Army and Air Force.

In addition, KAI received a contract in June 2013 to produce 40 aircraft for the Republic of Korea Marine Corps, with first deliveries expected in 2017. An further variant is being proposed by KAI to fulfil the Republic of Korea Navy's long-term ASW needs.

In January 2013, it was announced that the navy had awarded a contract to AgustaWestland for the procurement of eight AW159 Wildcat helicopters as an interim solution.

The deal is valued at $560 million including aircrew and maintenance training, spares and support, with a stake of $358 million for AgustaWestland. Deliveries will start in 2015 and be completed in 2016.

NEW PRIORITIES

Elsewhere, with Japan openly acknowledging concerns about an increasingly expansive China, the Japan Air Self-Defence Force (JASDF) has laid out plans for a range of platforms, including the V-22 Osprey tiltrotor, under a $239 billion five-year programme.

In January 2013, amid tensions in the East China Sea, the government announced that Japan will increase defence spending for the first time in 13 years with a request from the MoD for an additional $1.3 billion to $51.7 billion, which is an increase of 0.8%.

The JASDF plans to acquire 17 V-22s – in what will be the second export sale of the tiltrotor after Israel – as well as Global Hawk UAVs, F-35 fighters and support aircraft, a procurement endorsed by the government at the end of December.

The Osprey purchase could prove controversial – in 2012, the US was confronted with local opposition to the planned deployment of 24 MV-22 Ospreys at the USMC's Futenma Air Station in Okinawa Prefecture, as Japanese officials voiced concern over noise and safety issues associated with the aircraft.

In January 2013, Eurocopter Japan delivered the tenth EC135 training helicopter to the Japan Maritime Self-Defence Force under a contract awarded in 2009 to replace its single-engine training helicopter fleet.

Taiwan is also undergoing a comprehensive helicopter fleet renewal and will be the first export customer to receive the latest version of the Apache.

The $2 billion deal for a total of 30 AH-64Es was closed in 2008, and Boeing received the final contract to build the helicopters in October 2010. July 2014 will see the delivery of the last batch. The Apaches will add a third squadron to Taiwan's attack helicopter fleet, currently made up of AH-1W Super Cobras.

In February 2010, Taipei signed a $111 million contract with Eurocopter for three EC225 SAR helicopters with an option to acquire 17 more, while the Obama administration announced plans to deliver some 60 Black Hawk utility helicopters as part of a package valued at $3.1 billion the same year.

The UH-60Ms will supplement ageing Bell UH-1H utility helicopters, which will operate until their planned retirement in 2020. Deliveries of the Black Hawks will start in March 2014 and continue through 2018.

LANDS OF OPPORTUNITY

Further opportunities for growth exist in the rapidly expanding helicopter markets of Malaysia and Singapore as well as to a lesser extent in the Philippines, Sri Lanka, Thailand and Vietnam.

In Sri Lanka, Russian Helicopters – which historically has had a strong foothold in many countries across the region – secured an order for 14 additional Mi-171 helicopters.

The Sri Lanka Air Force started operating Mi-17s in 1993, and the current fleet of 13-18 machines equips No 6 Helicopter Squadron at Anuradhapura, in north-central Sri Lanka. The order is part of a $300 million ten-year loan to buy military equipment, which was signed during a 2012 state visit to Russia. ***DH***

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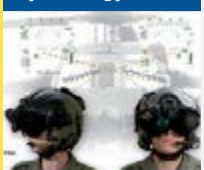

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As the drawdown gathers pace in Afghanistan, the shape of the helicopter MRO industry is changing to reflect new and emerging operational requirements. **Peter Donaldson** explores how service providers are adapting to meet them.

The slowdown in operational tempo that will likely follow the planned end of NATO combat operations in Afghanistan this year should take the pressure off the military helicopter operators involved and the MRO organisations that support them.

However, the shift in posture to smaller home-based forces poised for rapid deployment at short notice presents its own set of challenges that financial constraints magnify. Managing this, while adapting to and exploiting changes in helicopter and maintenance technologies as well as best business practices, is the name of the game in this complex transitional period.

Airframe manufacturers, their associated MRO organisations and independents are variously opening new facilities internationally, merging supply chains, gaining leverage from cloud computing and exploiting innovations in tools, both physical and virtual.

Mixing military with civil MRO has long been normal practice, and a healthy civil helicopter industry driving investment in new facilities provides synergistic opportunities.

EXISTING EXPANSION

Agusta Aerospace Services' new repair and overhaul centre in Zaventem, near Brussels airport in Belgium, is a case in point. It represents an expansion of an existing facility and of AgustaWestland's support in Europe for civil and military customers, such as the Belgian Army and the Dubai Air Wing. Plans for the 2,016m^2 plant, which opened on 23 September, hinge on turning it into a centre of excellence for AW109 transmissions, while preparing to support the AW189 and AW169 alongside continuing work on older types.

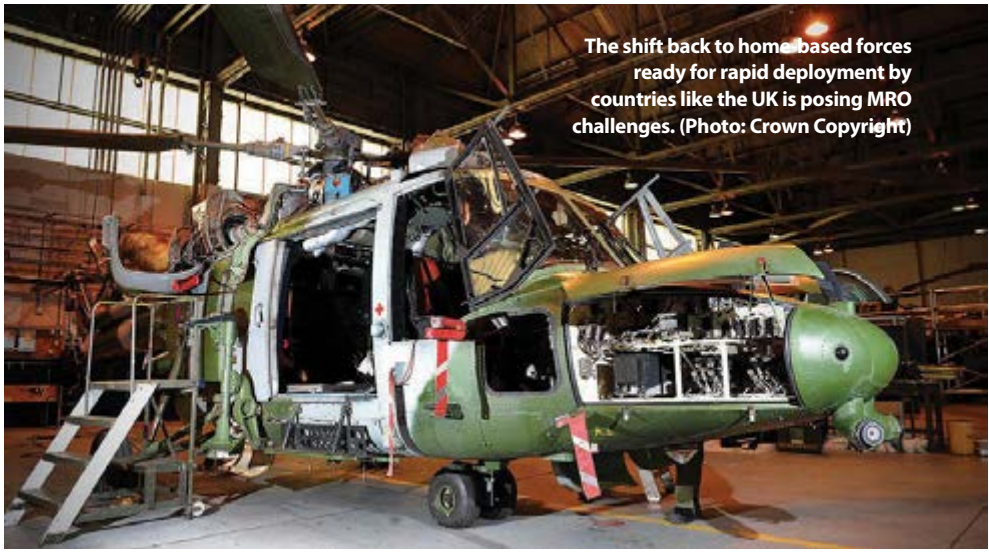
With Norway signing on the dotted line on 19 December for 16 AW101s to replace its SAR Sea Kings, AgustaWestland and Kongsberg can implement their 26 September agreement to expand the latter's development work on maintenance and testing for AW101 rotor heads and gearboxes.

According to Kongsberg, the agreement covers the transfer of advanced equipment for full functional testing of gearboxes and other new maintenance technologies. This new equipment will provide opportunities to work on other aircraft, including the 52 NH90s delivered or on order for the Nordic countries.

Transmission test rigs are usually dedicated to individual helicopter types, with OEMs either building their own or commissioning bespoke equipment from specialists such as Mustang Advanced Engineering, Renk or the Southwest Research Institute (SwRI).

However, the technology is moving towards generic rigs. Leading the charge is RedViking, whose flexible transmission testing system reportedly enabled the US Army to replace 20 type-specific rigs with five reconfigurable equivalents. The company is the new identity of the business formerly known as Superior Controls – the name change becoming official on 1 February 2014.

Using transportable test fixtures, MRO personnel can prepare a main gearbox outside the test rig, roll it in and couple it up for testing, saving a lot of time. RedViking's new rigs also feature 'ultra-efficient' power regeneration to save money and provide some green credentials.



The shift back to home-based forces ready for rapid deployment by countries like the UK is posing MRO challenges. (Photo: Crown Copyright)

New technologies could reduce the amount of time spent on gearbox maintenance and testing. (Photo: USN)

ENERGY RECOVERY

Based in San Antonio, Texas, SwRI has built many test rigs for US military aircraft and has variously incorporated mechanical and electrical energy recovery.

In mechanical systems, four gearboxes – test rig components, not items under test – form the corners of a square, coupled to form a closed-loop and driven by an electric motor. This spins all the gearboxes without applying a load to the test article. Connected between separate pairs of gearboxes are the test item and a pre-load device, which applies the required torque loading. The power circulates around the loop so the drive motor only needs to overcome frictional losses.

In an electrically regenerative rig, the four corners are occupied by an AC electric motor, a generator and two variable-frequency drives (VFDs), which can act as rectifiers to turn AC into DC, as regulators to control voltage and as inverters to turn DC into AC.

The AC motor drives the gearbox being tested, which in turn drives a generator as the load. Generator output goes into the first VFD, which turns it to DC and onto a common DC bus, and then feeds it to the second VFD. This in turn feeds AC back to the electric motor. Again, the power drawn from the grid need only be enough to overcome parasitic losses.

Russian Helicopters continues to extend its international MRO presence through joint ventures (JVs), opening a new service centre in Johannesburg in March, in partnership with Denel Aviation, to offer services for Africa's 600 or so Russian-built helicopters. The facility's initial focus is on civil aircraft, but in June the companies agreed to extend their services to MRO and upgrade Mi-8s and Mi-17s, both military and civil.

Closer to home, the company extended its cooperation with Turbomeca through an agreement signed on 27 October to establish a new maintenance centre in Russia. Plans call for the facility to look after Arrius 2G1 and Ardiden 3G engines that power Kamov Ka-226Ts and Ka-62s respectively.

Kamov aircraft were also the subject of an agreement signed on 23 October between Russian Helicopters and Aircraft Repair Plant No 405 (ARP 405) in Kazakhstan, which already services Russian-built helicopters operated in Central Asia.

Peru's purchase of 24 Mi-171s for its armed forces, announced on 18 December, is to come with a new regional MRO centre set to open in the first quarter of 2016 and be capable of 'major operations' by 2018.

BUSINESS MODEL

Boeing Sikorsky International Services (BSIS), the JV formed to compete for support work on Saudi Arabia's AH-64E Apaches and UH-60M Black Hawks, could become a model for other operators of both companies' machines, according to David Adler, Sikorsky's VP of strategic partnerships.

'Both our companies have significant experience in the full spectrum of rotorcraft training and support, so the JV really does provide a best-of-industry solution that offers our customers streamlined, affordable services,' he said. 'Drawing on our joint expertise, BSIS will exemplify a single-source provider of local and comprehensive sustainment for rotorcraft platforms worldwide.'

Also competing for integrated helicopter maintenance in Saudi Arabia is a team led by Northrop Grumman. On 6 December, the company announced its own JV with Vinnell Arabia and Northrop Grumman Aviation Arabia, plus AAR, DS2 and Qinetiq North America.

Vinnell Arabia began supporting Saudi Arabian National Guard aviation with the introduction, integration and operational support of helicopters in late 2012.

Streamlining support for aircraft is the focus of a ground-breaking deal signed in June by the Royal Netherlands Air Force (RNLAF) under which the OEM will integrate spares and maintenance for the service's Chinooks and Apaches. Supply chains for the two types will merge under the $60 million integrated contractor logistics support contract.

Delivered in the Netherlands and Fort Hood, Texas, support will be based on the expected number of flight hours. RNLAF commanding officer Lt Gen Alexander Schnitger characterised the deal as more than a support contract – he described it as a long-term partnership that will increase aircraft availability at lower costs.

ON A ROLL

While the Boeing deal with the RNLAF consolidates support for two types from the same airframe manufacturer, the six-year contract between the UK MoD and Turbomeca signed in September covers the RTM322 engines on RAF and Royal Navy Merlins and British Army Apaches. Claimed to be worth £367 million ($602 million), the deal is designed to provide a guaranteed level of availability while reducing repair costs.

Eurocopter – or Airbus Helicopters as it has been re-branded as of 1 January – has also launched new MRO-related offerings over the past year, announcing cloud-based maintenance information services and the Eurocopter – Helicopter on Theatre Services (E-HOTS) 'total support solution' at the Paris Air Show.

E-HOTS offers modular packaged services in partnership with logistics expert Daher, specialist support and training provider DCI, consultancy firm Eurotradia International and in-house MRO provider Vector Aerospace. Operators can choose among modules covering scheduled and unscheduled maintenance and even battle damage repair. There is also a range of logistics packages supplying transport, spares, tooling, consumables and maintenance facilities – operations packages encompass dry and wet leasing, including crews and specialised equipment.

The cloud-based maintenance information systems will be delivered in partnership with software provider Ramco Systems and deliver MRO applications to PCs, tablets and smartphones.

Meanwhile, Sikorsky's new phase-maintenance kits for the Black Hawk, including the UH-60A, L and M plus the S-70i, are proving popular. The kits are intended to provide all the parts to the latest standard and in the right quantities for the 360- and 720-hour preventative maintenance inspections. Feedback from field service personnel has informed the contents of the kits, grouping components required for specific maintenance operations.

'Sikorsky has received very favourable responses from its international-based customers who were instrumental in prompting the development of these kits,' Adler told *Defence Helicopter*. 'These kits have streamlined their inventory and maintenance inspections.'

Sikorsky's phase maintenance kits for the Black Hawk family group together the components required for specific tasks. (Photo: Sikorsky)

The future evolution of kits may be influenced by the company's integrated vehicle health management systems (IVHMS), Adler noted. 'Sikorsky is deeply invested in IVHMS technology, a pathway forward to condition-based monitoring. Future plans may include tailoring the kits accordingly.'

RELIABLE DIAGNOSIS

If replacing exactly the right parts during each phase of maintenance is a major driver of efficiency in MRO operations, so is the ability to diagnose faults reliably. The most difficult and frustrating are intermittent faults in electrical systems – glitches that show up in flight, but result in no-fault-found (NFF) reports in subsequent testing. Sikorsky's subsidiary company Derco Aerospace has acquired rights to distribute a technology that is making a concerted assault on the problem.

The Intermittent Fault Detection and Isolation System (IFDIS) from Universal Synaptics, for example, combines patented intermittent fault detection circuitry with an environmental chamber that can shake, freeze and bake suspect modules and LRUs to make them misbehave. IFDIS simultaneously monitors every electrical path in the unit under test while exposing it to a simulated operational environment.

Sikorsky's aftermarket team has built up experience with IFDIS in general line maintenance of several helicopter types, including the RAF's Chinook fleet on which the portable Ncompass version has diagnosed and pinpointed previously elusive faults with the wiring and circuit breakers in both mission-critical and safety-critical systems, some of which have led to fleet-wide modifications and further testing contracts.

BREAK WITH TRADITION

'Traditionally, aircraft maintainers have scrapped electrical components where the source of intermittent faults could not be identified,' said Brian Holt, president of Derco Aerospace.

'IFDIS's capability to easily detect faulty wiring, inter-connections and aircraft electrical components offers our commercial and military customers a savings in both time and money while improving aircraft availability. Defective components can be repaired and expedited back into reliable service – at a fraction of replacement cost.'

While feedback from IFDIS tests can lead to more reliable designs, it raises the question of whether the capability could be built in, Sikorsky's view is that, in the short term, incorporating this feedback is the best way to improve the aircraft without committing extra space and weight to an onboard system. However, 'additional R&D capabilities are being examined to consider the feasibility of directly integrating IFDIS technology into the aircraft'.

Holt noted: 'This revolutionary new technology gives us a capability above and beyond any of our competitors. In just two years, the USAF repaired more than $50 million of avionics components that had been taken out of service due to their high NFF rates. This is an exciting new opportunity for us in this niche market.' ***DH***

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Theatre experience

Lt Col Ulf Landgren has been acting head of Sweden's Helicopter Battalion since June 2013. Alan Warnes spoke to him about the challenges facing the force as well the nature of its current mission in Afghanistan.

There is no doubt 2013 was a hectic year for the Swedish Helicopter Battalion, arguably one of the most active military rotorcraft forces in Europe.

According to Landgren, who has flown 1,100 hours on military helicopters in Sweden, it was a 'very busy year' for the force.

'The A109s [HKP 15] fulfilled anti-piracy operations in the Gulf of Aden for four months, NH90 [HKP 14] training was ramped up to around 800 hours flying time, and we received our fifth helicopter in December,' he explained. 'However, it was the deployment of our UH-60Ms [HKP 16] to Afghanistan and the redeployment of our Super Pumas [HKP 10] which took up most of our time.'

The acquisition of the UH-60M was a model of Swedish efficiency. As the acting chief pointed out, the Super Pumas operating at Mazar-e-Sharif needed to be replaced by 1 April 2013, which fuelled many of the decisions taken. For example, the UH-60Ms were delivered to Sweden in basic US Army configuration.

MEETING DEADLINES

'In order to meet the April 1 deadline for Afghanistan, everything was kept as per the FMS package, which included Common Missile Warning Systems, radar signalling detection sets and laser warning sets. The only changes were the Swedish Armed Forces logo on the tail and a new crash device.'

This saw four UH-60Ms being air freighted to Afghanistan in mid-March 2013, and by the end of the year they had flown nearly 700 hours – quite a feat for a force that did not receive its first aircraft until December 2012.

The four helicopters will stay at Mazar-e-Sharif until mid-May 2014 when the mission is expected to end – one always remains on maintenance, and another acts as a standby for the two that are on alert.

A DIFFERENT BALL GAME

'Our helicopters provide tactical medevac with a doctor and anaesthetic nurse on board. Whereas the Pumas landed in prepared landing zones, under the control of allied troops to medevac soldiers, civilians and Afghan police, it is a different ball-game for the UH-60Ms. For example, if there has been a roadside bomb, it will land as close to the road as possible.

'A two-ship UH-60 formation, which we know as a chase formation, will go forward during the mission. One will secure the area ensuring there are no enemies, while the other will land on the unprepared area to pick up the wounded. On board the first helicopter, there are usually two pilots, a gunner and one technician doubling up as a gunner. On the second helicopter, there is the nurse and doctor along with two gunners, with the ability to pick up to two wounded.'

Landgren continued: 'The Black Hawk has done a lot more flying than the Puma because it is a "missionised" helicopter designed for the type of outlying missions in a tough environment like Afghanistan. Tougher-built, with superior self-protection systems and better Kevlar protection, it has several different types of dual systems backing one another up in case of failure. Thus, it has more combat time than the Puma, [which is] designed for calmer conditions and landing zones.'

A 15-minute alert is maintained, with the Swedish personnel spending two days/two nights on alert then standing down for two – when rest and training takes place.

'Being on full alert at the command post for a lengthy time, wearing all the required flying gear, can be quite tiring and even going to the toilet can be difficult,' Landgren noted, adding that when the Swedes are off, the German NH90 or US Army UH-60 units take over the rotation.

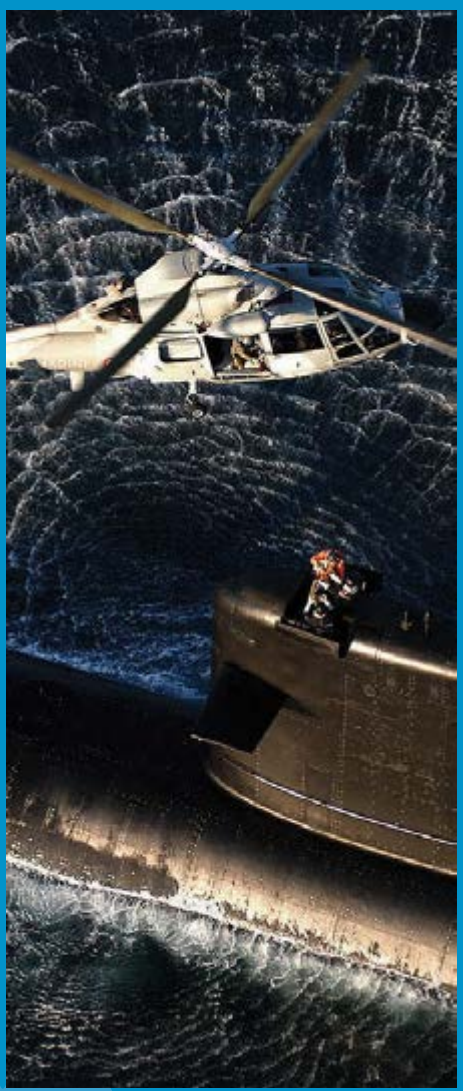
The nature of the missions means they should be swift, so enemy combatants cannot prepare for a strike at the vulnerable helicopters.

'We try to pack the sorties into the golden hour in which the Black Hawk lifts off, heads to the destination, picks up casualties and then flies back to the German field hospital at Mazar-e-Sharif. The mission usually takes around 20-40 minutes.'

He concluded by summing up the working conditions the Swedish troops face supporting their allies.

'It can be 40°[C] in the helicopters, perhaps even a stifling 70° on the ramp, and with life-saving equipment strapped on, you have to be in good shape.

'While there are ten people on alert, there are another 25 staff, including the unit commander, working in the plans, ops, intelligence departments to ensure everything is running smoothly. Rotation is eight weeks on and then eight weeks off. There are two deployable units – one is in Sweden keeping currency ready to replace the other in Afghanistan.' ***DH***



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