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ROTORHUB

THE HUB OF THE HELICOPTER BUSINESS



On the approach

EC175 gets ready for service

PLATFORM FOR INDUSTRY

Enstrom's Tracy Biegler

FIRST STEPS

Asia-Pacific market

CROSSED WIRES?

Kazan Ansat type focus

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CONTENTS

Volume 6 Number 4
August - September 2012

34



Law enforcement: Balkan sentinels 34

The Bulgarian Border Police is the latest such service in Europe to establish its own aviation element, equipping itself with modern technology in a bid to protect the southern fringes of the continent.

Ex-military aircraft: Born again 38

Purchasing ex-military helicopters for civil applications is becoming an increasingly common practice. However, there are many restrictions in operating such machines.

Technology focus: Playing catch-up 42

The idea of synthetic and enhanced vision systems for helicopters has been around for six decades, but it is only in recent times that they have become more prevalent.

Rotorcraft guide (part 30) 47

From Fairchild-Hiller (Rogerson) FH-1100 to Guimbal Cabri G2

Collective Pitch 48

Kim Harris of Aviation Specialties Unlimited re-examines some preconceptions about using NVGs and searchlights, and finds that military best practice does not always translate well to civilian EMS operations.

Comment 3

News 4

- Canada to modernise coast guard helicopter fleet
- New helicopter to be jointly produced in Russia
- FAA refuses weight exemption for Bell 429
- Eurocopter unveils X6

Platform for industry: Small wonder 8

A modest-sized company it may be, but Enstrom has managed to notch up some impressive sales against the bigger OEMs. *RotorHub* speaks to Tracy Biegler, the company's director of sales and marketing, to find out the secrets of its success.

Market analysis: First steps 13

The Asia-Pacific region is increasingly considered by many OEMs as a potentially prosperous market. *RotorHub* takes a look at opportunities for airframers to expand their presence in the region.

HEMS: Medical multi-tasking 20

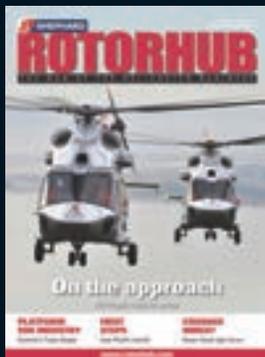
Not only do EMS helicopters offer a fast response to emergencies, they are becoming more capable of providing treatment while airborne and operating through the night safely. *RotorHub* considers the future of the air ambulance.

Type focus: Crossed wires? 24

The Kazan Helicopters Ansat was designed as a new twin-engine helicopter in the 3.5t-class, but certification of its flight control system proved to be a major hurdle that is affecting the type's commercial prospects.

EC175 update: Final hurdles 31

If all goes to plan, the Eurocopter EC175 will be certified by the end of this year, with first deliveries shortly afterwards. *RotorHub* went to Marignane to see what customers will be getting for their money.



Cover story 31

The EC175 is due to be certificated by year-end and is now actively being marketed as a SAR platform. (Photo: Eurocopter)

13



20



31



38



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Big promises

A war of words is emerging over the future over the UK's SAR helicopters, and it's one that's likely to turn political before a contract decision is made at the beginning of next year.

At the Farnborough air show, both AgustaWestland and Eurocopter publicly revealed big intentions should the AW189 or EC175 respectively be chosen as the aircraft of choice for the mission. Eurocopter said it planned – should its platform be selected – to create a 'centre of excellence' for SAR customisation of the aircraft, training crews with simulators and developing a specialist team who would serve the worldwide SAR market from a UK base.

With the UK as a 'trendsetter', Eurocopter believes other nations would follow in its footsteps and queue up for SAR-configured EC175s, giving its British business a share of this success. However, it was down to AgustaWestland to take this idea a step further and capture the headlines. 'Should the AW189 be selected,' the company said, 'all SAR-configured AW189s will be assembled at AgustaWestland's Yeovil factory, not just those for SAR-H, but all AW189s sold worldwide.'

To ensure the message got across, the Anglo-Italian airframer wooed key politicians, and as a result there were visits from Prime Minister David Cameron and Secretary of State for Defence Philip Hammond. This effort has been taken further, with the company planning to carry out some 200 hours of flight testing on one of the AW189 prototypes in the UK over the coming months.

To many, both are impressive promises, and at a time of austerity neither option can be discounted by politicians who need to get the economy back on track. From the outside, AgustaWestland's argument is difficult to ignore for the government – after all, the production of a civil helicopter in the UK is guaranteed not only to secure jobs but create many more, not just for final assembly, but also elsewhere in the supply chain.

This would come at a fortuitous time as contracts from a shrinking Ministry of Defence begin to dry up. Clearly, AgustaWestland with its Finmeccanica backing has significant clout, but so too does Eurocopter. With its recent purchase of Vector Aerospace, the EADS-owned manufacturer also has some substantive political leverage due to employing a large UK workforce.

However, the politicising and promises by the two companies may well have put their clients uncomfortably on the spot and opened the Long SAR bids up to new levels of scrutiny, especially as the choice of the aircraft does not lie in the hands of government minister but with the company that will go on to operate them.

Is it really fair that the fate of hundreds of new jobs, the development of new infrastructure or the safeguarding of national skills should now hang in the hands of executives at Bond, Bristow or CHC Scotia – the three firms now left in the bidding for the Long SAR contracts?

The answer is probably not.

These three should be left to decide for themselves which aircraft is the best choice for their needs and whether the platform they select will be able to fulfil the role for the decade or more they are expected to remain in service after 2016.

It's easy to imagine the headlines of some nationalistic UK newspapers if the EC175 is ordered over the potentially 'British-manufactured' AW189. A similar furore occurred when Soteria was chosen as the preferred bidder for the cancelled SAR-H programme with the S-92. One article decreed that a Franco-Canadian consortium had chosen an American-built aircraft for the task.

It's difficult to know which aircraft is better or more suitable for the current contract. However, the decision needs to be taken by those in the know, rather than politicians with an eye on securing their seats for the next election. While their intentions were honourable, the OEMs may have made life that little bit more difficult for the bidding teams – and after the debacle of SAR-H, delay and political posturing is the last thing needed now.

Tony Osborne, Deputy Editor

NEXT ISSUE

- ◆ Piston engines
- ◆ Night flying
- ◆ Flight training
- ◆ Satellite tracking

Canada to modernise coast guard helicopter fleet



The Canadian Coast Guard still operates the Bø 105 despite increasing costs of operation. (Photo: USCG)

The Canadian government has fired the starting gun on the procurement of new helicopters for the country's coast guard, it has emerged.

Fisheries and Oceans Canada, the department responsible for the service, is looking to procure 24 new

aircraft over the next five years to replace the current fleet of 22, including MBB Bø 105s, Bell 212s and Bell 206L LongRangers. The Canadian Coast Guard is looking for 16 light and eight medium-lift helicopters.

The project additionally specifies the purchase of at least one flight simulator.

The helicopters will also support the future missions of Canada's new polar icebreaker, the CCGS *John G Diefenbaker*. The chosen aircraft are expected to have a service life of

30 years and feature low operating and maintenance costs.

'Helicopter air support is a crucial component to the delivery of coast guard services and the maintenance of public safety,' said Keith Ashfield, Minister of Fisheries and Oceans. 'Renewing the Canadian Coast Guard fleet of helicopters will stimulate economic growth in the aerospace industry, as well as create a variety of jobs and business opportunities.'

The coast guard says its helicopters support several programmes that contribute to the safety, national security and sovereignty of the country. Missions include everything from flying to remote sites to support construction and maintenance of coast guard communication sites to providing at-sea support for ice monitoring.

By Tony Osborne, London

New helicopter to be jointly produced in Russia

AgustaWestland and Russian

Helicopters have signed a teaming agreement to jointly develop a 2.5t single-engine helicopter, it has been revealed.

Speaking at this year's Farnborough air show, AgustaWestland CEO Bruno Spagnolini said the overall programme would be shared on a 50-50 basis and would be designed for the worldwide market across a range of applications.

'This will be a completely new 2.5t, single-engine helicopter that we will develop together with our Russian Helicopters colleagues. It will be totally different from the [AW119] Koala, which is at the top end of this class. The new helicopter will be designed to compete at a lower cost,' he said.

While Spagnolini was unable to provide a definitive timeline for the

new model's development or a first flight date, he said progress 'would be quite fast'.

The agreement builds on the Helivert joint venture for the assembly of the AW139 at a plant in Tomilino near Moscow. Spagnolini noted that there was enough spare capacity at the facility for production of the new helicopter.

Dmitry Petrov, CEO of Russian Helicopters, said: 'We are pleased

to be expanding our partnership with AgustaWestland to include the development of this new light helicopter.'

'Co-operation with other global leaders represents an important component of our strategy as we continue developing new products to meet the constantly evolving demands of our customers around the world.'

By Tony Skinner, Farnborough

Eurocopter unveils X6, further product renewal plans

Eurocopter CEO Lutz Bertling has revealed the company plans to build a clean-sheet aircraft, codenamed the X6, in Germany.

Bertling mentioned the project during a visit to the company's factory at Donauwörth in Bavaria by Germany's Minister of Economics and Technology, Philipp Rösler, on 2 August.

Eurocopter would not comment on the weight or class of the aircraft,

but it is understood to be for the civilian market.

The news emerges after a report in the French newspaper *Le Tribune* disclosed the codenames of other major product renewal programmes being undertaken by Eurocopter engineering departments.

The newspaper report suggests that X2 is the codename for the successor to the AS350/AS355 Ecureuil, and the X6

is the expected successor to the Super Puma and Cougar family of aircraft.

Company officials have told *Rotorhub* that both types are due for replacement by 2020.

Squirreling away

Developing a successor to the AS350 will be a major undertaking, given that the type is still enjoying strong sales and is being offered for a number of major

military procurement programmes, including India's light utility helicopter requirement. In the meantime, the backlog of EC225/725 orders extends back around two years, with the company producing a mix of models for military and civil customers. A handful of AS332 L1/2 models are also being built at Marignane, including a pair of VIP AS532 L1s for the Georgian government.

By Tony Osborne, London



Photo: Bell Helicopter

FAA refuses weight increase exemption for Bell 429

The FAA has denied a request from Bell Helicopter to permit an increase in the maximum gross weight of the Bell 429 from 7,000lb (3,175kg) to 7,500lb.

In a nine-page statement released on 13 August, the agency said that the granting of an exemption was not in the public interest, despite around a dozen other worldwide civil aviation authorities giving the green light to the increase, including China and Canada.

However, while acknowledging that the exemption would increase the usefulness of the aircraft, the FAA said: 'We anticipate that there will be very minimal economic benefit to the overall public if the petition for exemption is granted. We anticipate that most of the economic benefits will be realised only by Bell Canada, Bell 429 operators and their customers.'

The FAA is concerned about setting a precedent with such a decision, pointing out that an aircraft's gross weight is an 'early design consideration'. It said: 'The development and manufacturing costs and market viability of a rotorcraft hinge largely on its type certification basis. The applicability sections in Parts 27 and 29 create a level playing field for rotorcraft

designers, so that from an engineering, investment and marketing perspective, all applicants work to the same regulatory expectations.

'The exemption relief sought would, if granted, place the Bell 429 at a competitive advantage to other rotorcraft over 7,000lb already required to meet Part 29.'

The FAA also revealed that parties opposed to the exemption were other rotorcraft manufacturers, a foreign Part 29 rotorcraft producer, and the European Aviation Safety Agency (EASA).

Public interest

One of these opposing parties said that granting the exemption would be 'an attack on the current FAA and EASA harmonised type certification and airworthiness standards, implying a lower level of safety for a Part 27 product', claiming that it would both 'undermine the integrity and fairness of the airworthiness standards of Part 27 certification and safety protections' and create a 'terrible' precedent for the FAA.

Bell spokeswoman Susan Gordon told *RotorHub*: 'While the FAA's decision is disappointing, Bell Helicopter remains

confident in the future of the Bell 429, both in the US and globally, particularly as the number of countries accepting the IGW [increased gross weight] continues to grow.

'Our business plan is based upon the remarkable customer response to the Bell 429 as certified, not the incremental benefit of the IGW. We have requested a meeting with the FAA to discuss their decision.'

The document follows an exemption request to the FAA made in January, just days after Transport Canada approved the increase. Bell's petition suggested that the changes would result in 400 additional jobs, increase sales of the aircraft from 150 to 500 and yield revenues of \$3.3 billion over 20 years. It also stated it would result in increased levels of safety for a range of roles.

Bell has been particularly vocal about the exemption, putting out press releases each time another country grants permission for the increase. In August, both China and Thailand agreed to the change, while Argentina announced it was happy with the exemption in July.

By Tony Osborne, London

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13 July 2012



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Bond, Bristow and CHC shortlisted for UK Long SAR

Bond Offshore, Bristow and CHC Scotia have been named as the operators to be shortlisted for the UK's Long SAR helicopter contracts.

The ten-year contracts, worth £2.3 billion, will see SAR provision by civilian operators flying modern aircraft, replacing the Sea Kings currently operated by the RAF and Royal Navy.

In a statement issued by the Department for Transport (DfT) on

27 July, the three companies have been shortlisted to participate in the 'competitive dialogue stage'. There are three lots available to bid on.

Lot 1 will deliver the service at, or in the vicinity of, Culdrose, Leconfield, Stornoway, Sumburgh and Valley, with a minimum rescue capacity per aircraft of eight casualties/survivors (two stretchered) and a minimum radius of action of 200nm (250nm at Stornoway).

The second package will deliver the service at/or in the vicinity of Chivenor, Lee-on-Solent, Lossiemouth, Prestwick and Wattisham, with a minimum rescue capacity per aircraft of four casualties/survivors (two stretchered).

The combined third lot covers services from all ten bases.

The shortlist signals the end of NHV's bid, while the Osprey consortium of British International Helicopters,

Babcock and Era Helicopters dropped out of the competition back in May.

The competitive process means that no details about the bids have been revealed, but they are likely to involve types such as the S-92, AW189, EC175 and possibly EC225.

The DfT says it plans to announce the successful bidders for the lots in early 2013.

By Tony Osborne, London

Helibras forecasts major oil and gas helicopter boom

Eurocopter subsidiary Helibras is eyeing a requirement from Brazil's state-controlled oil company for 80-90 medium and heavy helicopters over the next decade.

Petrobras plans to boost oil production by more than 50% over the next four years by developing fields as far as 300km offshore.

Speaking at the Invest in Brazil event in London on 8 August, Helibras executive VP Eduardo Mauad said the projected demand from the oil company was expected to fuel sales of Brazilian-assembled EC225 helicopters.

'Oil and gas activities in Brazil are growing very quickly and strongly. Platforms are being located further and further offshore. So naturally helicopters are the necessary means of transport there,' he said.

'Petrobras is demonstrating a need for around 80 to 90 medium and heavy/medium helicopters in the next seven to eight years. This means a lot of production.'

In December 2011, Petrobras revealed that it was using or contracting 91 helicopters for offshore activities, including 20 heavy machines. The company's demand for large

helicopters has been forecast to increase by as much as 350% as it goes further out to sea to establish fields in the pre-salt area.

The major offshore helicopter operators will be looking to increase their partnerships with Brazilian companies to take advantage of this expected boom in demand. For example, CHC is currently represented by Brazilian Helicopter Services, while Bristow works with Lider Aviação.

Eurocopter has invested more than \$200 million in Brazil and expects to soon open a new technological research centre as it moves towards its ambition of conceiving, designing and manufacturing a new design of helicopter in the South American country.

Mauad revealed that the company was nearing a decision about which class of helicopter in Eurocopter's portfolio would be replaced by the Helibras-produced machine.

'Brazil is a strategic country, not just for Eurocopter but for EADS as well – and we are defining over the next few months which kind of helicopters will be developed and



Photo: Eurocopter

fully industrialised in Brazil. This means lots of subcontracting and support activities in the future,' he explained.

'Some that are flying today are getting to the end of their life and they must be replaced. And it will be replaced by a helicopter that is fully conceived and

industrialised in Brazil. And this is to deliver worldwide, not just for the region and Latin America.'

The new helicopter is expected to start rolling off the production line in ten years' time.

By Tony Skinner, London

Helicopter orders placed since 11 June 2012

Aircraft	Operator	Date	Total
EC135	CALSTAR	15 August 2012	8
S-92	Milestone Aviation Group	10 August 2012	19
GrandNew	Wisniewski	25 July 2012	1
Bell 429	Iowa Mercy One	23 July 2012	1
AW139	Maryland State Police	18 July 2012	3
EC225	Tokyo Fire Department	17 July 2012	1
AS350 B3e	Utah Highway Patrol	12 July 2012	1
Bell 412	Hawker Pacific	12 July 2012	3
AW169	Linfox	11 July 2012	3
AW169	Specialist Aviation Services	11 July 2012	6
MD 500E	St Louis County Police Department	11 July 2012	1
AW139	All Nippon Helicopter	10 July 2012	1
AW189	Era Helicopters	10 July 2012	5
AW139	Polizia di Stato (Italy)	9 July 2012	2
AW139	Russian government agency	9 July 2012	3
AW139	Japan Fire Disaster Management Agency	9 July 2012	1
AW139	Yokohama City Fire Department	9 July 2012	1
AW139	CHC	9 July 2012	10
AW169	Latin American VIP operator	9 July 2012	1
AW169	UAE government operator	2nd quarter 2012	5
MD 540E	Swiss operator	February 2012	1
AS332 L2	Georgian government	N/K	2

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A modest-sized company it may be, but Enstrom has managed to notch up some impressive sales against the bigger OEMs. Tony Osborne speaks to Tracy Biegler, the company's director of sales and marketing, to find out the secrets of its success.

Small wonder

Enstrom Helicopter Corporation may not be the biggest name in the industry, but recent successes are forcing the little company's competitors to sit up and pay attention. After scoring spectacular successes in Japan and Thailand providing training helicopters for the military, and securing a deal with Ukraine for patrol helicopters, the Menominee, Michigan-based manufacturer is looking forward with new-found optimism.

'We have been able to sneak in under the radar,' explained Biegler. 'All these competitions had the major manufacturers involved, and we surprised a couple of people in what we offered. More importantly, we are surprising our critics in how we are supporting the programmes and are able to deliver – our customers are pleasantly pleased with what they are getting.'

Following an eight-year sales campaign, the company secured a contract to provide 30

Model 480Bs to the Japan Ground Self-Defence Force. The deal followed another critical sale of 16 examples to the Thai Army, which also purchased the type for training. Negotiations are continuing with Ukraine, which settled on buying the 480B for the country's border guard. The deal could see a total of 24 aircraft being purchased.

Hit hard

The good news is a far cry from 2008 when the economic downturn impacted on the industry and the private and corporate market in particular – an area Enstrom had come to rely on. 'It hit everybody very hard, and it's another reason I knew we had to get into the government and military market mix,' he continued. 'We were almost all completely private, and we had to have something to take care of that issue. We commercially had gone down to about five aircraft a year, and that was a drastic reduction from the 20s we were doing.'



The turbine-powered 480B has become Enstrom's top-selling product and a hit with military flight training schools in the Asia-Pacific region. (Photo: author)



Photo: Enstrom

Between 2005 and 2008, the company was producing between 20 and 30 aircraft a year, but this fell to single digits in 2009 and 2010. While Enstrom had hoped that the low output would be mitigated by the Thai Army contract, the programme was delayed by a year. Adding to the problems was an influx of low-houred Enstrom aircraft on the second-hand market.

'Commercially, I am still seeing difficulties throughout the market,' observed Biegler. 'But international is more active than domestic, although finally I am seeing some activity in the private market in the US – most of our dealerships are seeing the same. If it is going to happen, it is not going to be until after the elections when people re-engage with their monetary assets. Customers are saying: "I'd like to, but..."'



“We don’t particularly deal in the used market, but that has been as active as any new market used to be, perhaps even more so. Overall, Enstrom products had been increasing in value relatively and holding their own up until the recession. The big question for a buyer is: “Where do I put my money if I am going to buy?””

He continued: ‘When you are talking about the private market, you are talking about, in a sense, a luxury. Yes, some people use it for business purposes, but it’s in essence a luxury item, and if you did the research into the used aircraft, a lot of what is being purchased is to support the commercial operators who are finding really good deals. Their business has been continuing to thrive due to the low-cost asset availability.’

Training type

With the success of the aircraft in Thailand and Japan, Biegler believes the Enstrom family has found a new niche as a training aircraft, and expects this area to take on a new focus as helicopter operations increase in countries with previously closed airspace.

‘We have done our research, and it suggests that training will be growing in the near future between [replacing] the Vietnam-era pilots [in the US] and the activities in all these countries where they are opening up their airspace to some degree, such as China and India,’ he explained. ‘The fact that the ex-Soviet areas are opening up to Western aircraft means there are more training opportunities, so we have been meeting with training organisations asking what they need.’

Since Enstrom was formed in 1957, the company has produced around 1,200 helicopters, with 750 still flying – the vast majority are piston-engined models, while 150 are turbines. The highest annual production rate occurred in the late 1970s when over 100 aircraft were produced.

‘This year, we are planning on producing 22 helicopters in a mixed fleet – next year we are looking at 31, and the year after that over 40. We have a nice backlog, many programmes and the private market is still going to turn around. In the past, this market was our 20 or so aircraft sales, and right now that’s almost zero. If you take the military and government products that we have been growing and the private market, which I hope grows, and add new territories like China, the order books will continue to fill up.’ ➔

Potentially, the company can produce up to 55-60 aircraft a year at its current facilities, depending on the mix, as the turbine 480B takes longer to assemble.

Biegler is also optimistic for the aircraft's opportunities in the US law enforcement market. Currently, only a handful of Enstrom-built helicopters serve with such agencies, but in the new age of austerity, police departments are having to do more with less, and are being forced to merge air support units with other departments. Even surplus OH-58s and OH-6s once considered cheap are becoming increasingly expensive to maintain as the supply of parts begins to tighten, pushing up operating costs.

Attracting attention

'It will be a couple of years before they [law enforcement agencies] are back in an acquiring mode, because there was a significant reduction and closure of police units,' explained Biegler. 'I think they will come out with austerity-type budgets, and we are going to have people looking very hard at what we are offering.'

'We offer something they can own and operate under a municipal lease programme for less than

they operate surplus aircraft. The problem is getting the purchasing organisations and others to understand that. Buying an aircraft is still a tough sell, but we have many different police organisations stopping by and taking a look. They would never think of us in the past, but we are now getting that attention.'

Law enforcement-equipped Enstrom aircraft can be fitted with an IR camera, searchlight and electronic flight information system avionics fit, among many other police options.

'It can be a very well-equipped surveillance aircraft,' he continued. 'It is very suitable for that work, with its high-inertia rotor head, visibility and other safety features that we have built in, such as its inherent stability and mechanical trim system that provides operators with a relatively low workload when they are undertaking surveillance missions.'

'The police are finding that the aircraft can keep them low and slow, and, again, trimming it up they don't have the fatigue they would experience on other platforms. They like the wide cabin and comfortable seats, while the four hours of mission fuel gives them a wide range of options.'

The company offers three aircraft in its product line – the piston-engined F-28F and 280FX and



A trio of 480Bs for the Thai Army pose in front of the Enstrom plant in Menominee, Michigan. (Photo: Enstrom)

the turbine-powered 480B. All three use the Enstrom-designed high-inertia main rotor system, which gives the helicopters their highly commended autorotation capabilities, as well as the unblocked tail rotor, allowing the aircraft to fly in winds of up to 35kt.

Top seller

The 480B was actually designed to meet the needs of the US Army's New Training Helicopter programme launched in the early 1990s. However, this was won by a Bell 206B-3 JetRanger variant. Enstrom realised the type's potential for the civil market, and it has now

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become the company's top-selling product. The piston-engined variants continue to sell, but orders have been impacted by Robinson's family of light helicopters.

'When the R22 came out, the Enstrom management decided to let them [Robinson] have the training market, and when they wanted a real helicopter, they would come to us. But what you learn in, you grow into, so even though the R22 flies differently than almost every other helicopter, they built the R44, and people moved into it and were comfortable with it.

'Robinson did a wonderful job creating a new market. In hindsight, I would say one of Enstrom's mistakes was leaving the training market, and in particular not having something which would support that, price-wise. This is due to the fact that we created the most powerful piston aircraft on the market by adding the turbocharger. That addition adds to the direct operating cost and makes Robinson an attractive option, at least at sea level.'

Rethinking plans

The company had tried to develop a four-seat piston helicopter during the 1970s, but the necessary engine for this size of aircraft did not exist. More recently, Rolls-Royce's decision not to pursue certification of the RR500 turbine has forced the company to rethink its plans for a larger aircraft in the future.

'We looked at that [engine] because we need the power out of it to grow and make a bigger aircraft - we are not stopping thoughts on the development of a new aircraft, but it certainly put a dent in our plans,' continued Biegler.

'What I have found with customers who have a turbine [is they] want to move up. When they do, they move into many different platforms, but I would like to be there for when they do. Lots of customers have said they wish Enstrom made a bigger aircraft.'

While pursuing new opportunities, the company is taking the time to invest in its capabilities and boosting production efficiencies by acquiring new machinery and investing in better tools to improve consistency.

'We are not just an OEM, we are also a completion centre, and we help our customers

get what they need on the aircraft,' he explained. 'If there is a new requirement, we will work as cost-effectively as possible to develop it for our aircraft, whether it is new avionics or attachments.'

Biegler admits that he is impressed by some of the new entrants in the light helicopter market, including the French-built Guimbal Cabri G2. 'The Cabri is a very interesting aircraft. They are doing the right thing, seeing the training issues in the market - they have an excellent idea, making a safe three-blade system, and his price point is one I can compete with.'

He believes that Enstrom's product support will continue to put it ahead of its competitors because the company builds 95% of the aircraft, and therefore it can typically dispatch parts within one day to anywhere in the world.

'People who walk through the factory talk about how impressed they are with the people and friendliness, the availability and the quality - it's one of the best selling points. The management has been solid for eight years now. We all have the same focus, we all have the same desires - it's an organisation that takes the customer first.' **RH**



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The Asia-Pacific region is increasingly considered by OEMs as a potentially prosperous market. **Tony Skinner** takes a look at opportunities for airframers to expand their presence in the region.

Passenger services like Sky Shuttle's Macau-Hong Kong flights could become more common in Asia. (Photo: AgustaWestland)

First steps

One common assertion swirling around the helicopter industry in recent years is that OEMs will need to find new markets to fuel further growth, in light of the continuing downturn in Western sales, particularly on the military front.

Near-term forecasts suggest a bumpy ride in domestic markets in Europe for both the military and civil markets, with little growth expected as governments tighten their belts.

While the CEOs of the various helicopter companies are outwardly confident of a strong recovery in the civil market – Eurocopter for one predicts medium growth over the next five years for North America – it has yet to return to the boom times of 2007 and 2008 when manufacturers were enjoying large backlogs of orders.

Refocusing efforts

All eyes have seemingly fallen on Latin America and Asia, and their level of growth has provided encouragement, despite volumes still being

significantly smaller. For the latter in particular, the small numbers of civil helicopters in service in such heavily populated regional powerhouses as China and India have led to some commentators predicting the next gold rush of sales.

While Australia and New Zealand together have just shy of 3,000 civil helicopters in service, India only has around 300, while in China the number is even smaller at 160 civil-registered machines, according to data provided by the newly established Australian Helicopter Industry Association (AHIA).

Aware of the growth prospects behind such figures, major helicopter manufacturers have recently looked to expand their presence in the region through partnerships with domestic players and establishing new regional service centres.

For example, Bell Helicopter formally opened a new facility at Seletar Aerospace Park in Singapore in conjunction with Textron sister company Cessna Aircraft at the end of July. The manufacturer said this was the 'result of years of planning for an increased presence in Asia-Pacific', which was now

'New Zealand and Australia are contract buyers of pre-owned helicopters from Japan and other countries.'

a key market for Bell. In 2011, around 9% of its revenue came from Asia.

The centre is envisioned as a regional hub for further involvement in the area and will be used for MRO work, training, major refurbishment projects and customisation/completions.

Speaking to Bloomberg from Singapore following the opening of the facility, John Garrison, CEO of Bell Helicopter, noted that the Asia-Pacific region had developed into a 'strong, profitable market' for the company. 'We are seeing significant growth [on a] year-on-year basis, and it is really across the region,' he said. ➔



Global Vectra Helicorp has quickly expanded its fleet to become India's largest private helicopter operator. (Photo: Eurocopter)

'China is the number two economy in the world and is predicted to overtake the US by 2020.'

Taking office

In February, Sikorsky announced it was establishing an office in Malaysia, in a 'first step' towards expanding its presence in Southeast Asia. 'Malaysia is centrally located in ASEAN [the Association of South East Asia Nations], with one of the strongest aerospace markets in region,' Linda Scott, general manager of the office, said at the time. 'Opening an office in Malaysia allows Sikorsky to be best located to support all of its Southeast Asia customers, and we look forward to the new opportunities to grow our relationships in the region.'

Such moves could uncharitably be described as the US companies playing catch-up with their European counterparts AgustaWestland and Eurocopter, which have long followed a strategy of partnering with local companies to increase their regional footprints.

In terms of current sales of new civil helicopters in the region, Tomoo Nakayama, chairman and director of ITC-Leasing, noted that Japan still appeared to top the list, followed by India. 'The most active market is India under its "open sky" policy,' he said. 'Then the most prospective market with quite big future expansion is China. Japan is the biggest helicopter market in Asia, with stable imports of twin helicopters due to EMS, fire-fighting and rescue helicopters constantly upcoming as brand new helicopter requirements. New Zealand and Australia are contract buyers of pre-owned helicopters cheaply purchased from Japan and other countries.'

With China now entrenched as the number two economy in the world – and predicted to overtake

the US by 2020 – the pressure to widen civil helicopter operations there increases with each new billionaire to enter the Hurun Rich List. Several challenges remain, however, not least of which is the reform of China's low-altitude airspace, currently under strict military control.

'The Chinese government and CAAC [Civil Aviation Administration of China] are still cautious about helicopter accidents, so do not allow privately licensed pilots to fly,' explained Nakayama. 'People need to go to the AOC [air operator's certificate]-granted operators to fly those helicopters owned by private owners and pilots.'

'2016 is the date for them to completely open the sky for helicopters, as a period of five years is what CAAC and the administration consider sufficient for private-licensed pilots to become mature and acquainted with professional flights in a safe manner.'

Future forecast

Eurocopter is one company eyeing the expected boom that a loosening of airspace restrictions might bring. It is predicting that as many as 1,500 rotorcraft may be operating in China within the next decade, and anticipates taking advantage of the relationships garnered during the EC175's joint development programme.

'I'm optimistic that within the next ten years we'll be delivering around 100 helicopters a year. Eurocopter has several decades of experience in China and a strong geographic footprint, with teams already up and running in Shanghai, Beijing, Harbin, Chengdu, Wuhan, Shenzhen and Hong Kong,' Bruno Boulnois, CEO of Eurocopter China, wrote in the company's internal magazine.

Another factor is growth in China's offshore oil industry, which is fuelling an increasing demand for helicopters. The China National Offshore Oil Corporation presented its five-year plan in 2011, outlining the country's oil production needs and calling for additional deep-water drilling →

There are only around 160 civil helicopters in China, including this China Southern Airlines/Zhuhai Helicopter S-76. (Photo: Sikorsky)



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'India's general aviation market is set to grow at 10% per annum.'

operations. As a result, Citic Offshore Helicopter Company (COHC) has moved to expand its fleet, confirming orders for seven EC225s and four EC155 B1s.

The increasing presence of Chinese drilling companies overseas has opened up new markets for COHC, which is looking at the possibility of international expansion and partnerships. (For more on the Chinese civil helicopter market see the next issue of *RotorHub*.)

India has also quickly risen through the world economy ranks in recent years, and was rated by the IMF as number three in 2011. The country's general aviation market – comprising around 800 fixed-wing aircraft and 300 helicopters – is set to grow at 10% per annum, with nearly 300 business jets and 250 helicopters expected to be added to the present fleet by 2017,

according to a recent PricewaterhouseCoopers report.

This is expected to further exacerbate air traffic congestion at Mumbai International Airport and Delhi International Airport – the busiest in India. Mumbai, the commercial capital with almost half of the country's corporate turnover, has its airport slots constrained due to lack of space, and 'is actively discouraging business aviation movements', according to Kapil Kaul, CEO South Asia at CAPA Centre for Aviation – a Sydney-based think tank.

Identifying issues

To safely increase the volume of helicopter operations in India through streamlined operations, trained personnel and safety considerations, a helicopter aviation safety technical assistance study was recently completed, led by Bell Helicopter under the US-India Aviation Cooperation Programme (ACP).

'This will provide operational solutions for helicopters and alleviate some of India's transportation infrastructure shortfalls,' said an ACP official.

Conducted jointly with India's regulator, the Directorate General of Civil Aviation, the study

Thailand's SFS Aviation is another Asia-Pacific operator enjoying the oil and gas boom. (Photo: AgustaWestland)

addressed the paucity of dedicated helicopter-trained inspectors, providing safety training for those inspectors and standardised heliport operations and inspection standards. It also proposed a plan for EMS landing and take-off sites and flight routes – India presently has no air ambulance infrastructure.

A study on a new corridor for helicopters and an analysis of high-density areas and overlapping in Indian airspace are now planned by the ACP. This will likely be awarded to either Bell or



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Washington Consulting, *RotorHub* understands. The ACP was formed to support the growth of the Indian civil aerospace sector and identify and execute projects that provide access to US expertise, technology and best practices.

Elsewhere in the region, Australia's civil helicopter fleet is undergoing a dramatic expansion, fuelled by the country's strong economic growth, which is forecast to continue in the near to medium term.

At the end of June 2012, the Civil Aviation Safety Authority (CASA) aircraft register showed the

growth rate of the civil helicopter industry running at 10% per annum (or three times that of the wider Australian economy), and in the past ten years rotorcraft numbers have doubled from 980 to 1,970. At the present growth rate, the overall fleet will double again in the next seven years.

According to information released by the AHIA, there is also an expectation that the continuing energy and resources boom in the north of Australia will increase demand for helicopters beyond the present annual growth rate of 10%. By

way of comparison, the civil industry in the US is struggling to achieve a 2% increase each year due to economic difficulties.

Growth in Australia's SAR and HEMS sectors is also increasing public demand for improved helicopter services in remote areas.

Sustaining services

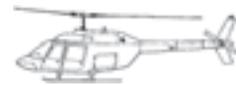
However, some significant challenges remain for such growth figures to be sustained. Due to the expansion in the mining and offshore exploration sectors, the number of heavy helicopters in service is increasing at almost three times the rate of the single-engine fleet. Growth in the SAR, HEMS and offshore sectors has also helped fuel a 21% annual growth of the twin-engine fleet – compared to the single-engine's 8%.

According to the AHIA, many senior managers are worried about the industry's capacity to train staff for the new multi-crew, IFR-capable helicopters that will arrive in the next six years.

A shortage of flight instructors will also be aggravated by the transfer of Australian Army and Navy helicopter pilot training to a civilian contractor under the Helicopter Aircrew Training System project scheduled to start around early 2016. ➔

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MHS Aviation is one of several operators supporting oil and gas exploration off the Malaysian coast, with EC225s the most recent addition. (Photo: Eurocopter)



This will further drain the 30 Australian flying schools of highly experienced staff.

'It is predicted the annual increase [in the multi-engine group] will be substantial around 2015 as the military outsource pilot training to the civilian industry,' the AHIA wrote in July. 'This will coincide with major oil and gas projects entering their final development stages. Offshore demands will also increase, raising concerns about availability of staff, especially in engineers, where many are now being poached by the mining companies.'

Getting older

Furthermore, if the industry continues to expand at the current rate of 9-10%, there is the fear that manpower problems will restrict growth, especially given CASA figures showing that the average age of helicopter pilots and engineers is 48.

Across the Tasman Sea in New Zealand, growth has been less dramatic, with a drop in tourist numbers due to the financial crisis and the Christchurch earthquake affecting helicopter operators.

However, the annual increase in helicopter numbers remains at around 3%, or twice real GDP growth. With 775 rotorcraft in service in July, the country, with a population of some 4.4 million, leads the world for ownership per head.

Helicopter numbers in other countries in the region are still relatively low, according to AHIA-compiled figures. Currently, Malaysia has 75 helicopters and two flight schools, Thailand has around 70 helicopters and one flying school, while the number currently operating in Indonesia is unknown. The growth of helicopter activity in the former country has largely stagnated in recent years due to political and investment problems, but the increase in offshore work has led to engagement from the major OEMs.

AgustaWestland is establishing a new training academy in Kuala Lumpur, and plans to introduce an AW139 full flight simulator (FFS) from 2013. Malaysia's Weststar Aviation Services has become a major user of the AW139.

The country has also been selected to house Eurocopter's EC225/EC725 FFS to provide

training on the type to all Asia-Pacific customers. In addition, in December it was announced that Malaysian firm CTRM had signed an agreement to build the fenestron for the EC130.

Maturing market

The latter development is one indication that the market is beginning to mature in the eyes of Western OEMs, which are likely to increasingly move manufacturing to the region followed by R&D activities.

Roel Spee, global leader at IBM Global Business Services, said this was a trend that had already been observed in Eastern Europe. 'In terms of foreign investment, R&D often follows manufacturing after a number of years on a global and regional scale,' he said, speaking at an industry investment event in London in August. 'In Europe, for example, we have seen a lot of companies set up manufacturing in Eastern Europe over the last 15 years. After a number of years, companies tend to follow with engineering activities and R&D activities close to the production base, because it very often works together.'

'We have seen that particularly in Asia - companies moving to Asia for the first time with manufacturing, but at a certain point they also want a research base in those markets. China, as the main market in Asia at the moment, has attracted a lot of that research activity.'

Spee said the key challenge was to make sure not only that the market was there to absorb the new output, but also that the company had access to engineering skills in sufficient numbers to fulfil the needs of the research centres. **RH**

Additional reporting by Neelam Mathews



Kawasaki Heavy Industries produces the EC145 in Japan under licence, where the type is used in the ENG and EMS roles. (Photo: KHI)



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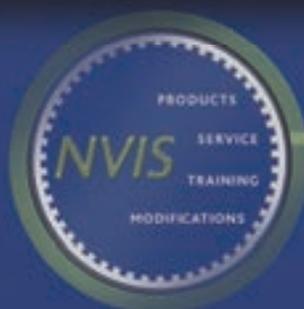
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Across the world, air ambulance services are evolving to enhance patient survival. Whether it is the initiation of night-time operations, use of new onboard equipment or the introduction of larger helicopter types, the changes could help bring about a step change in the way EMS operators conduct their business and ultimately save lives.

Although the way EMS helicopters are funded and operated differs from country to country, the aim of preserving life remains the same. In recent years, there has been a greater push for larger, more capable aircraft to undertake this role. Previously, the EMS helicopter was simply seen as a form of evacuation to speed up the process of getting the patient to hospital and into the operating theatre within the 'golden hour' – the critical period following injury when prompt medical treatment can mean the difference between life and death.

Survival rate

A study from Johns Hopkins University in Baltimore, Maryland, published in April this year, suggested that seriously injured trauma patients transported to hospitals by helicopter were 16% more likely to survive than similar casualties brought in by ground ambulance. The researchers found that the advantages of a helicopter flight were both its speed and the quality of the emergency medical team aboard, which usually comprises the most experienced crews.

However, study senior author Adil Haider noted that in some cases helicopters do not help due to the costs involved and increased risk of flying in general. 'We need a better way to make sure this scarce and valuable resource is used appropriately,' he said. 'We need to sharpen our ability to identify trauma patients who need the helicopter most to ensure that we deploy it for people who really will benefit from its use.'

With these concerns in mind, there has been an increasing emphasis on delivering emergency treatment at the scene or in the air – a move that not only requires more equipment and flight nurses and doctors, but extra room in the cabin for these personnel to work. Therefore, this ultimately demands a larger helicopter.

In the US, the EMS sector continues to be robust regardless of the austerity affecting other parts of the helicopter market. Despite concerns that operators would increasingly turn back to cheaper-to-operate single-engine types, the requirement for twin-engine helicopters still drives EMS procurement. According to companies such as Metro Aviation and American Eurocopter, there is a continuing trend towards purchasing larger aircraft.



DRF Luftrettung (illustrated) and ADAC provide the majority of Germany's EMS helicopters, with aircraft based at key locations around the country. (Photos: DRF Luftrettung)



Medical

The University of Michigan's Survival Flight is now operating the Eurocopter EC155 on EMS duties across the state. The aircraft, one of the largest dedicated EMS helicopters operating in the US, was configured for the role by Metro Aviation, and according to Mike Stanberry, president and CEO of the company, more are likely to follow in Survival Flight's footsteps.

'With the state of the economy, we expected operators to be going down the single-engine route, but they haven't done that – they are going for the larger helicopters and light twins, so it's very encouraging,' he said.

Stanberry noted that other operators were also seeing the potential of types such as the EC155, and there was interest for several more examples to join the US EMS community in the coming year. Meanwhile, sources at American Eurocopter told

RotorHub that the company has sold AS365 N3s in the US for the first time in several years, and other Dauphin family aircraft are likely to follow to EMS customers.

Repeating patterns

In Canada, this requirement for larger aircraft has already been expressed through the purchase of the AgustaWestland AW139 by EMS operators STARS and Ornge, although the acquisition by the latter has proved highly controversial.

In Europe, the pattern has been repeated. The publicly funded Scottish Air Ambulance signed a contract in June to operate a pair of new EC145 T2s from 2014. The aircraft are significantly bigger than the EC135s they replace, and the Scottish Ambulance Service, which oversees the operation of the helicopters, said the

Not only do EMS helicopters offer a fast response to emergencies, they are becoming more capable of providing treatment while airborne and operating through the night safely. Tony Osborne considers the future of the air ambulance.



multi-tasking

new fleet will deliver improved range to all of mainland Scotland and allow improved response to emergencies in the Western Isles and Orkney. The type's increased range also means fewer refuelling stops.

Germany's DRF Luftrettung has ordered 25 of the type, recognising its potential night flying capabilities and the size of its cabin. Several air ambulance operators have also decided to buy the larger AW169, with eight examples being ordered by UK operators, including Warwickshire & Northamptonshire Air Ambulance and Specialist Aviation Services, which provides aircraft to EMS operators across the UK.

'There is an increasingly closer relationship between the air ambulances and the hospitals,' explained Nigel Lemon, sales and marketing director at Specialist Aviation Services. 'Hospitals

are being turned into major specialist units, but because there are fewer of them, they are further apart. We see air ambulances being increasingly used to transfer patients in addition to their typical HEMS duties.

'These transfers might require patients to be flown the length and breadth of the country, so [the aircraft] require greater range and the capacity to carry extra personnel or equipment, such as ECMO [extracorporeal membrane oxygenation] systems for life support. These aircraft feature avionics that will make it easier to conduct night operations and not just those from lit helipad to lit helipad.'

Indeed, several UK air ambulance charities are investigating the potential of introducing night operations into non-lit off-site landing locations. This work is now being backed up by a new CAA safety directive, which lays down further

minimum safe operating requirements to be met when conducting night HEMS operations, including the provision of risk assessments, observing and recording local weather conditions and, when operating with a single pilot and HEMS crew member, that the former holds a valid instrument rating.

The CAA has long stipulated that operations were possible as long as the aircraft were equipped with systems enhancing situational awareness at night, and they pose no greater risk than those taking place during daylight hours.

The East Anglian Air Ambulance (EAAA) is working to become the first operator of its type in the UK to begin night-time operations. In preparation, it is introducing NVGs and extra lighting, giving the organisation's aircraft the ability to make off-site landings during the hours of ➤



EMS orders are building for the AW169, seen here in prototype form (left), while its larger stablemate the AW139 is widely used on EMS duties in Australia and Canada. (Photos: AgustaWestland/STARS)

darkness. 'Flying at night will make it possible to support 30-35% more patients,' said Tim Page, chief executive of the EAAA.

Higher price

The decision comes at no small cost to the charity, however. Through a freshly signed seven-year contract with Bond Air Services, new aircraft will be introduced – including an EC135 T2e that was due at the time of writing and an EC145 T2 expected to enter service in December 2013 – as well as training and equipment associated with nocturnal operations, pushing the contract cost from £4.5 million (\$7 million) to £6 million. Night flying also demands an extra shift of pilots and rear crew to ensure the aircraft is operational around the clock.

'We have had terrific support – everyone is motivated by it and totally committed, the people know it is the right thing to be doing,' added Page.

The EAAA says the air ambulance could be flying its first night-time mission by November, with training of pilots and paramedics commencing in September. The decision was partly motivated by the expected loss of capability when the region's police helicopter becomes part of the National Police Air Service. Because of the fit of the law enforcement aircraft, it is able to operate by day and night and carry doctors to off-site landing areas. 'East Anglia are set to become the real trail-blazers in night-time flying, but they are truly taking a step into the unknown, and all the other air ambulances are watching with interest,' said Clive Dickin, national director of the UK Air Ambulance Association.

Several continental European operators have already gone down this route. Germany's ADAC began NVG training late last year, giving it the capability to utilise non-lit landing sites. These

aircraft are funded and operated by a non-profit part of the German automobile association.

Another area where UK air ambulances have made headway is in the carrying of blood, with the London Air Ambulance (LAA) becoming the first such organisation in Europe to do this. The LAA has installed SCA Cool Logistics Credo containers – known as 'golden hour boxes' by the British military – in both the aircraft and its rapid response cars, each carrying four units of 'O' negative.

Preserving life

The idea is that the blood can be given as part of an inflight or pre-flight transfusion, which can improve the patient's chances of survival. However, carrying blood presents its own problems. It has a limited shelf life, and in order to prolong it, the blood must be stored at a specific temperature.

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Previously, normal saline was used, but because it does not carry oxygen it is not an ideal resuscitation fluid – unlike blood, which carries oxygen and can be delivered to major organs, including the brain. Because of this, doctors say that a pre-hospital blood transfusion can improve the patient's chance of survival. The carriage of blood is unlikely to become more widespread in the UK because of the issues of helicopter basing.

Direct access

The LAA has the advantage of operating from the rooftop helipad at the Royal London Hospital, giving direct access to hospital blood banks. This is an advantage not shared by most other UK-based air ambulances, which are located at airfields or central locations that provide the best access to the organisation's operating area. Given its 'big city' location, the LAA is also more likely to attend incidents involving major blood loss or trauma, such as industrial accidents or crimes like stabbings.

Australia's Ambulance Victoria air ambulance reportedly became the first civil operator in the world to carry blood in mid-2011, with Houston,



Eurocopter's new EC145 T2 is attracting strong interest from EMS operators looking for larger aircraft. (Photo: Eurocopter)

Texas-based Life Flight doing the same at the beginning of 2012.

Metro Aviation has had a busy year, delivering its first aircraft to Korean Air to begin a pioneering civilian EMS operation in South Korea. Recently, the company took over Paradigm Aerospace, which carries out customisation work on many Bell-produced models.

Stanberry said he was now looking at the potential of South America and particularly Brazil, where reports suggest that private toll-road owners may be required to provide EMS helicopters to serve local communities and the newly built infrastructure. 'Brazil is building thousands of miles

of new roads, and the private companies building them may have to provide helicopters for EMS duties, so this would be a market we are looking at tapping into,' he explained.

Ireland, one of the few nations in Europe without an air ambulance, launched an EMS operation in late May, using an Irish Air Corps EC135 to support the country's National Ambulance Service. The pilot project is designed to determine the level of need for such a service. It remains to be seen whether the operation, which is currently run out of Athlone in the centre of the country, will roll out to the rest of Ireland given the nation's current economic state. **RH**

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The Ansat was designed to be a simple yet sufficiently advanced and reliable machine. (Photo: Kazan Helicopters via author)



For the first time in Russian aviation history, an established manufacturing facility has managed to independently design and certify an all-new helicopter type.

The Ansat was developed with the philosophy of striking a balance between innovative and proven design solutions in an effort to achieve good performance at an affordable price. The baseline aircraft made its maiden flight in the hover on 17 August 1999, with the first forward flight on 6 October that year. The machine was granted its Russian type certificate in December 2004.

Designed and built from scratch at Kazan Helicopters, the most successful rotary-wing manufacturer in Russia, the Ansat was originally aimed at meeting projected huge demand in the government, parapublic (HEMS/SAR) and commercial (passenger transport/oil and gas) sectors in Russia, some of the CIS states and traditional former Soviet client countries in the Third World.

Production of the first ten-aircraft batch commenced in 2004, followed by initial deliveries in 2005. The Korea Forest Service (KFS) was

‘Lower pilot workload and much better controllability are said to be features of the Ansat’s FBW.’

The Kazan Helicopters Ansat was designed as a new twin-engine helicopter in the 3.5t-class, but certification of its flight control system proved to be a major hurdle that is affecting the type’s commercial prospects.

Alexander Mladenov examines why.

Crossed wires?

the type’s launch customer, receiving its first two aircraft in baseline configuration in 2005, to be used in the surveillance and fire-fighting role – the latter mission saw the helicopters equipped with Simplex fire attack systems installed under the belly.

Initial study

Initial design work at Kazan Helicopters on an all-new light twin to succeed the venerable Mi-2 began in 1993.

Marketing studies at the time identified a need for an advanced multifunction machine with a payload capability of 1-1.3t. The programme was seen as a good opportunity for the company – then producing only the Mi-8MT/Mi-17 13t utility and transport helicopters – to diversify its manufacturing portfolio, reduce the risk of being reliant upon a single model and eventually penetrate a new and promising market segment.

Initially, Kazan Helicopters management attempted to convince Mil Moscow Helicopter →

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The Ansat-LL is currently being used by Radar MMS to test seeker heads for ship-launched cruise missiles. (Photo: Kazan Helicopters)

The Ansat in figures

Max gross weight:	3,600kg
Normal take-off weight:	3,300kg
Max payload:	1,110kg
Ferry range:	890km
Max speed:	148kts
Cruise speed:	135kts
Service ceiling:	18,150ft
HIGE:	9,570ft
HIGE:	10,560ft

major Western manufacturers. It incorporates a four-blade main rotor with glass-fibre blades, a hingeless hub and a two-blade tail rotor.

According to Ansat chief designer Alexey Zaripov, the main and tail rotor blade tips and profiles are likely to be modified in a bid to further improve the helicopter's aerodynamic performance and reduce noise levels.

Western engine

The lack of a suitable Russian-made fuel-efficient, durable and reliable engine at the time of development led to adoption of the proven FADEC-equipped Pratt & Whitney Canada PW207K, rated at 630shp for take-off, 550shp at maximum continuous power, 710shp for 30s and 659shp for two-minute OEL operations. Preliminary design studies have been made for an Ansat derivative powered by the Klimov VK-800, rated at 800shp, which, together with the improved rotor, would result in a maximum take-off weight increase to 3,900kg.

The flight deck is described as modern, although once again it should be noted that ➔

Plant to join forces in the development and certification of a utility rotorcraft in the 3t class, but these efforts proved fruitless. In the event, Kazan took the bold decision to go it alone with the project, investing its own funds as well as obtaining financial support from the government of Tatarstan – a state of the Russian Federation, its capital is the city of Kazan, located some 700km east of Moscow.

The first step in the process was Kazan Helicopters setting up its own design bureau, as the company lacked any sophisticated capabilities in this area until the mid-1990s. Its design organisation approval was granted in 1997. Definition of the concept for the new helicopter was completed in 1995 and a fuselage mock-up was exhibited for the first time at that year's Paris Air Show. From the outset, the Ansat was designed to comply with the new Russian AP-29 Cat A airworthiness requirements.

In the Tatar language, the word 'Ansat' means 'light', 'simple' or 'easy', and it was chosen to reflect the basic design concept – a simple, yet sufficiently advanced and reliable rotorcraft.

Classic structure

The airframe has a classic all-metal structure, similar to that found on the well-known Mi-8/17 family, while composites are used only for some non-load-bearing elements. The structure is designed for a 20,000-hour service life.

The basic version accommodates one or two pilots and nine passengers. In the HEMS role, the cabin can house one or two stretchers and two

medical attendants, while in cargo configuration the Ansat can lift up to 1,300kg on an external sling. When used for VIP transport, a four-to-six-seat interior is available, while the SAR version has a hoist with a lifting capacity of up to 300kg, and the cabin can house two stretchers.

The rotor system is a state-of-the-art design by the standards of the Russian helicopter industry, but could be viewed as established technology by



The flag on the nose of this Ansat suggests it may be heading for the Kazakh army. (Photo: Kazan Helicopters via author)

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VIP, SAR, EMS, air ambulance and training versions of the Ansat have received or are due to receive supplemental type certificates. (Photo: author)



'In the Tatar language, the word Ansat means "light", "simple" or "easy".'

this in terms of Russian ergonomic standards – the layout is perhaps less advanced than those adopted for contemporary US and European light twin helicopters.

UKBP of Ulyanovsk developed and integrated the flight and navigation systems. The instrument panel of the baseline civil version features a pair of multifunctional colour displays in front of the pilot in the left seat, and there are also a number of electro-mechanical back-up instruments. The two Ansats delivered to the Russian Federal Security Service have been touted as the first production rotorcraft in Russia featuring a fully integrated glass cockpit.

Undoubtedly the aircraft's most novel feature – and at the same time the biggest factor still

hampering sales – is its fly-by-wire (FBW) control system, a first for a production-standard light helicopter in the world. To date, only Eurocopter is known to have tested such a system on a similar aircraft before, but its FBW EC135 is considered a pure research vehicle. The technology is also a first for the Russian helicopter industry.

The Ansat's KSU FBW system was developed by Avionika in Moscow and features quadruple back-up with digital and analogue computers.

The main advantages of FBW, according to Kazan Helicopters, are the ease with which it can

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The basic cockpit of the Ansat – the aircraft can be flown with one or two pilots. (Photo: author)

be adapted to suit a wide range of missions. It offers the advantages of lower weight and greater reliability, thus enhancing flight safety as it is free from problems that can affect a traditional control system such as jamming or failure of rods. Lower pilot workload and much better controllability are said to be other welcome features of the Ansat's FBW.

Certification troubles

Ironically, this advanced feature proved to be the source of a good deal of administrative difficulty after completion of certification by the Russian civil aviation authorities.

Following the crash of a KFS Ansat in Korea in 2006, killing the pilot, the entire fleet was grounded. Although it was proved later that the FBW was not a cause of the accident, it was a major setback, as the Russian authorities refused to permit further use of the Ansat for commercial passenger operations.

The reason cited was a lack of sufficient evaluation data related to the FBW certification. According to Kazan Helicopters director-general Vadim Ligay, civil certification of the FBW Ansat for commercial operations will again be possible in the future, when the official requirements for this type of control system have been finally determined.

In the event, Kazan's design team was forced to revert to a classic hydro-mechanical control system, building two prototypes in 2011. This new version is designated Ansat-M and flight testing began in 2012, while certification is due for completion by year-end.

Kazan has adopted a cautious approach to marketing the new model, and promotion of the Ansat-M in Russia and abroad is not slated to commence until after certification is complete.

Parapublic persistence

Meanwhile, an FBW-equipped derivative dubbed Ansat-K is still on the market – it was awarded a restricted type certificate in 2010, prohibiting

it from transporting passengers. This version is being promoted mainly for a range of parapublic uses. A military training model with a wheeled undercarriage for the Russian Air Force, the Ansat-U, has been successfully certified with the KSU-A FBW system and is now in production.

In terms of overall sales, after the purchase of five Ansats by the KFS, and one additional ➤

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‘A renaissance in sales is not expected until 2013 at the earliest, when the new Ansat-M appears.’

machine for the Korea National Police, there have only been a handful of deliveries to domestic customers.

First, an aircraft configured as a flying testbed (dubbed Ansat-LL) was procured by the Russian Navy on behalf of the Radar MMS company in St Petersburg, for use in airborne trials of various types of radar and IR seekers under development for ship-launched missiles. Four VIP-configured helicopters were ordered by Rossiya State Transport Company, with the first two slated for delivery in late 2007 or early 2008, but this never took place due to the troubles with the FBW system.

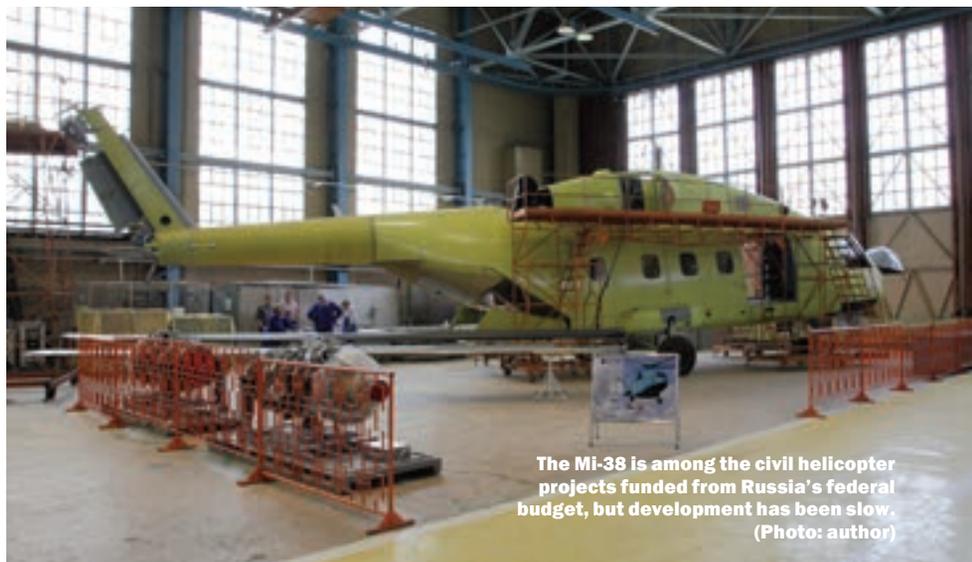
Two Ansats, however, were purchased by Russia's Federal Security Service, one more is operated by the Tatarstan Police Special Operations Air Detachment, while the Ministry of Health of Tatarstan became the launch customer for the HEMS derivative.

In April 2007, Kazakhstan became the first military export customer, with an order for an undisclosed number of the basic version for use in the training role. Other export customers announced in 2007 included countries like Laos and Venezuela (with an initial order for four helicopters) and in December that it was revealed by Kazan Helicopters representatives that an agreement to sell the Ansat to an undisclosed Iranian oil company had been reached, but again nothing happened due to the FBW certification issues.

Revival movement?

A renaissance in sales is not expected until 2013 at the earliest, when the redesigned and certificated Ansat-M will be brought to the market.

While Kazan Helicopters succeeded on the technical side of its bold venture to develop and produce a brand-new light twin, it has yet to prove that the design is commercially attractive. This could be a rather challenging undertaking in today's crowded Russian/CIS rotorcraft market in the 3-4t class, where the Ansat will have to compete for market share against a number of twin-turbine models offered by Eurocopter, AgustaWestland and Bell, most of which have recently reported strong sales in Russia. **RH**



The Mi-38 is among the civil helicopter projects funded from Russia's federal budget, but development has been slow. (Photo: author)

Long-delayed Mi-38 set for certification in 2015

Another promising project at Kazan Helicopters is the Mi-38, a new-generation twin-engined multirole heavy helicopter in the 15t class, which is expected to be in series production at the company by the middle of the decade. The type is among the priority civil programmes of Russian Helicopters, and as such enjoys significant support from the federal budget.

The Mi-38 was designed from the outset by Mil Moscow Helicopter Plant to comply with Russia's AP-29 airworthiness rules, said to be broadly equivalent to US FAR 29 and EASA Part 29. This means that the helicopter has performance and design features meeting the latest safety requirements.

The first prototype, OP-1, took to the air in December 2003 and the preliminary flight test phase, comprising handling trials and envelope expansion, was completed by late 2007. The second flying vehicle, OP-2, configured close to the production standard, commenced flight trials seven years later in January 2011. Both aircraft are powered by a pair of Pratt & Whitney PW127T/S engines rated at 3,300shp for take-off with a 3,600shp OEI emergency rating.

New shape

The third test vehicle, OP-3, is representative of the production standard and will be powered by Russian-made Klimov TV7-117V engines, OEI-rated at 2,800-3,750shp and with a take-off rating between 2,500 and 2,800shp. OP-3 is currently being assembled at Kazan Helicopters and is scheduled to fly in early 2013, while type certification is set for completion by 2015.

The Mi-38 was conceived as a modern heavy helicopter, with half the maintenance man-hours, a 75% smaller noise signature and six times lower vibration levels than its predecessor, the Mi-8/17, while the main systems are designed to eventually have a TBO that is six times longer.

The helicopter has a cabin with stand-up headroom and can accommodate 26-30 passengers when configured for utility transport, while up to 12 can be seated in VIP configuration. The usable space is 1.85m high by 2.36m wide and with the forward part of the tail boom is 10.70m long. When used for cargo transport, the cabin can house up to 5,000kg of freight, while in the air crane role, the Mi-38 can be equipped with a 7,000kg capacity belly hook. Follow-on versions are expected to boast a 6,000kg internal cargo capacity or up to 8,000kg as a sling load. The cockpit features the Transas IBKU-38 integrated navigation/flight control suite.

The potential civil market for the Mi-38, in Russia and abroad, is regarded as somewhat restricted, due to its considerably higher price tag than current and planned Mi-8/17 derivatives. It is expected, however, that there will be a significant domestic government and parapublic market for the type. The Russian Air Force is also being touted as a possible customer, and may introduce the type into service after it receives its civil type certificate, a fast-track procurement strategy already followed by the service for the introduction of the Kamov Ka-226 in 2011. **RH**

If all goes to plan, the Eurocopter EC175 will be certified by the end of this year, with first deliveries shortly afterwards. Tony Osborne went to Marignane to see what customers will be getting for their money.

In a few months time, Eurocopter will be handing over the keys of the first EC175 to launch customer Bristow.

The manufacturer has high hopes for the medium twin, especially after it reportedly exceeded the expectations of engineers and test pilots in terms of performance and capability. While the company has firmly placed the aircraft into the offshore oil and gas support market, it is now eyeing up the potentially lucrative SAR sector, marketing the type on its ability to reach all but the most distant rescues beyond 460km.

Since its maiden flight in 2009, the aircraft has been undergoing extensive flight testing and is on course to be certified by EASA at the end of this year. Two prototypes, PT1 and PT3, are currently flying – the former took to the skies in December 2009, while the latter flew almost a year later. Further trials have been taking place using a ground test airframe. The test fleet was imminently

due to be joined by the first production EC175, S01, which was being fitted with flight test instrumentation during *RotorHub*'s visit in June. Also on the line is the first customer aircraft, S02, ultimately destined for Bristow.

Feature suite

The aircraft will feature Eurocopter's self-developed Helionix avionics suite evolved from that used on the EC225, but will see TCAS II integrated into the autopilot. Furthermore, it will feature a new-generation HUMS developed from the Modular Aircraft Recording Monitoring System on the EC225.

Unlike the larger type, where the two systems require separate black boxes, the EC175's helicopter operations monitoring programme is integrated into the avionics, while the HUMS black box is smaller and carries a lower weight penalty compared to previous systems. In the

cockpit, pilots are presented with a 'black cockpit' warning system, indicating that if no status lights for key systems are lit, then those are ready for flight.

The overhead panel has been removed, with engine throttles moved to the centre quadrant between the pilots, eliminating the risk of birdstrike-related shock damage, and raised seating gives the crew an improved view over the nose. Among the options available to operators is the installation of a tail-mounted camera, giving the pilots a view of what is going on around the aircraft. The company is also studying the potential of a radar-based obstacle detection system, which could help reduce the risk of tail rotor strikes, although there is no timeframe for its introduction.

The aircraft is using a pair of 1,776shp Pratt & Whitney Canada PT6C-67E turboshaft engines – certified in April – which, as on the AW139, have to be installed 'backwards', as the engine was ➔

Final hurdles



Alain Di Bianca shows off the EC175 at La Fare near Marignane. The large windows give passengers and crew great visibility and improve emergency egress times. (Photo: author)



originally developed for propelling turboprop fixed-wing aircraft. As a result, it requires a unique intake and exhaust system, but the company says it has solved cracking problems experienced by other manufacturers by making the intakes longer and exhausts shorter.

Eurocopter claims the helicopter is burning about 450kg/h of fuel in the cruise, flying at around 140kt. The FADEC allows the aircraft to be started up and ready for departure in less than five minutes.

PT1 in its new SAR scheme displays for the crowd at Farnborough (top), while Eurocopter engineers work on SO2, the first aircraft for Bristow (right). (Photos: Eurocopter/author)



Aerodynamic additions

The EC175 has undergone a number of small modifications since test flying began, including the

introduction of endplates onto the tailplane. The addition of a 'fishtail' to the rear fairing of the engine compartment has also helped improve aerodynamic stability and the flow of exhaust gases over the back of the fuselage.

A critical aim of the programme was to give the aircraft a level attitude during the hover. Feedback from customer advisory boards set up during the type's development found that some operators did not like the nose-high hover attitude of types like the AW139. Part of this has been cured by using a canted tail rotor – the first time such a system has been used on a Eurocopter aircraft. As well as providing anti-torque, the 20° canting gives some extra lift.

While the helicopter is close to its target of certification, a number of key test phases are yet to be completed. At the time of writing, these included: hot weather testing, due to be conducted in Marseilles, France; cold weather testing, likely to be carried out in a climatic test chamber; and high-wind rotor start testing, which requires winds of up to 40-45kt.

Laurent Vautherin, EC175 programme director, told *RH* that the aircraft had comfortably completed a 30-minute dry run on the main gearbox, while an evacuation drill with a full load of

Bespoke SAR?

The EC175's appearance at Farnborough is part of Eurocopter's push to build interest in the type as a SAR platform. The manufacturer believes the aircraft will be an ideal mount for whichever company wins the tender for the UK's Long SAR series of contracts, as well as other major programmes around the world. The company sees this procurement as a trail-blazer, and one that other countries and governments will be watching closely.

Currently, no EC175 customer has specified a SAR mission capability for the aircraft, although two of the companies shortlisted for Long SAR – Bond and Bristow – have ordered the type for oil and gas work.

Eurocopter is developing a SAR mission kit for the aircraft that features a dual hoist and an EO/IR turret linked to a mission console in the rear cabin, as well as an option for a 120° or 360° surface search radar.

The company has also studied a range of cabin configurations. SAR aircraft would be configured to provide access to the large baggage compartment, allowing the stowage of equipment such as litter stretchers. Eurocopter claims the aircraft's performance would give a comfortable 250nm radius of action, allowing it to carry out all but the longest range missions. Such long-range flights could be made by the EC225, which may partner the EC175 in bids being offered to the UK Department for Transport.

Eurocopter has recently announced a tie-up with engineering firm Heli-One to provide the EC225 for Norway's All Weather Search and Rescue Helicopter programme. The consortium would use modified EC225s with an extended-range fuel tank in the rear of the aircraft, giving a radius of action up to 375nm.

passengers had taken just 27 seconds – less than a third of the time required by the authorities. The current plan is to certify the basic aircraft and then the oil and gas mission fit, with other role equipment such as SAR set to follow later.

The aircraft will also be certified to meet the MSG-3 maintenance programme, while a simulator for the type, currently being developed by Indra in Spain, will be installed at the HeliSim site next to the Marignane plant for pilot training. Work on the infrastructure for the simulator is currently under way.

While the EC175 firmly remains a joint programme with Chinese OEM Avicopter, the French side has left the other very much behind. Avicopter appears to be waiting for the Turbomeca Ardiden 3 engine currently under development, but is still producing major components including the fuselage and single-piece engine covers. These are currently being delivered by air to Marignane ready for assembly.

Quality control

Eurocopter would not give details about the planned production rate of the aircraft, but Alex Quemeneur, head of assembly on the EC175, said

the quality of components had been excellent, allowing a faster production turnaround compared to similarly sized aircraft in the Eurocopter family. The airframe uses an aluminium alloy construction, while several major components, including large single-piece engine fairings, are manufactured from glass fibre.

Gaining confidence

Several chief pilots from companies purchasing the type have flown the aircraft and praised its performance, handling and particularly the view from the cockpit.

Test pilot Alain Di Bianca described the type as highly capable. 'This aircraft almost flies by itself – it is extremely stable in the hover,' he said. 'There is a lot of power available – the single-engine performance gives the pilot a lot of confidence.'

Details released in January revealed higher than expected performance capability. The baseline payload/radius-of-action capacity is 250km with 16 passengers, an increase of 30%. The changes mean that 12 passengers can be carried 350km, while a possible 18-seat configuration, currently being mooted by engineers, would have a radius of action of around 185km. **RH**

Orders

Eurocopter received 111 bookings from 13 customers for the EC175 at the time of the aircraft's launch at Heli-Expo 2008 in Houston, Texas. Since then, only around 25% have been turned into firm orders. Interestingly, it appears that launch customer Bristow is yet to formally sign an order for the type, despite being due to receive its first aircraft by the end of the year. The following table shows the orders RH knows about and which operators have converted commitments to firm orders.

Operator	Number booked	Converted orders
Bond Aviation Group	N/K	-
Bristow	12	-
DanCopter	2	-
Halvorson Group (Era)	10 (+10 options)	-
Global Vectra	N/K	-
Heli-Union	N/K	4
NHV	N/K	10
Pegaso	N/K	-
UTair	15 (+15 options)	15
VIH Aviation	6	-
Total		29

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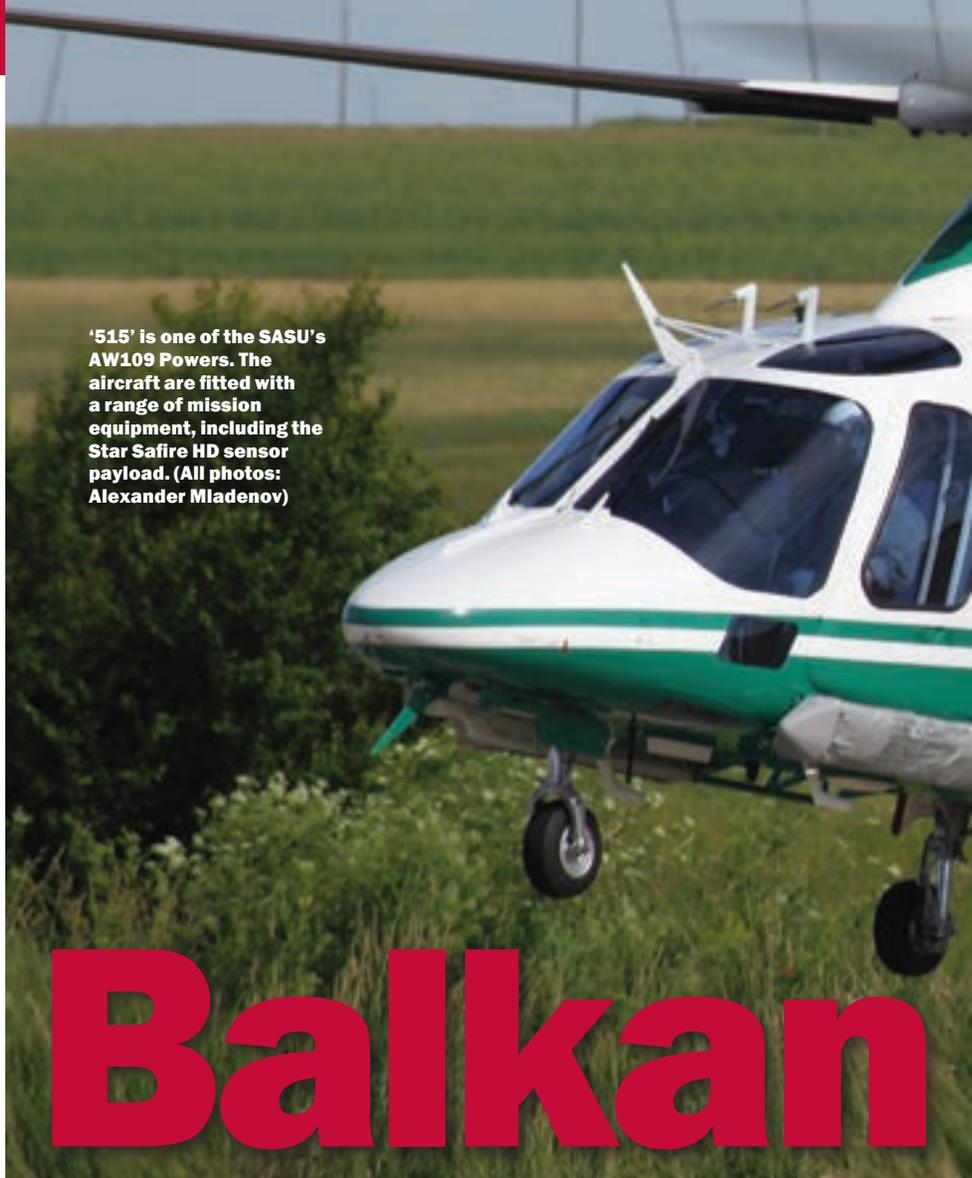
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The Bulgarian Border Police is the latest such service in Europe to establish its own aviation element, equipping itself with modern technology in a bid to protect the southern fringes of the continent.

Alexander Mladenov and Krasimir Grozev report from Sofia.

Established in April 2009 within the structure of the Bulgarian Ministry of Interior's (Mol's) Chief Directorate 'Border Police' (CDBP), the Specialised Air Surveillance Unit (SASU) is tasked with supporting the ground and sea patrol forces that secure Bulgaria's land borders with neighbouring non-EU states – the so-called 'Schengen borders' with Serbia, Turkey and the former Yugoslav Republic of Macedonia (FYROM) – plus the Black Sea and Danube rivers.

The SASU, which is stationed in the northern part of Sofia airport, commenced regular flight operations in January 2011 by deploying a pair of its helicopters to the forward operating base (FOB) at Bezmer – a military facility situated near the Turkish border. At the base, SASU flight crews initially started in-country flight training under the supervision of instructors provided by AgustaWestland, and the following month the first operational patrol missions were flown on the Turkish frontier, followed by flights over Bulgaria's Black Sea borders.



'515' is one of the SASU's AW109 Powers. The aircraft are fitted with a range of mission equipment, including the Star Safire HD sensor payload. (All photos: Alexander Mladenov)

Balkan

Formal handover

Two AgustaWestland AW109 Powers, serials 514 and 515, were delivered in December 2010 to the CDBP. A few days earlier, an AW139 medium twin, serial 520, was also delivered, with the formal handover ceremony for all three taking place on 15 January 2011.

The three helicopters were procured by the Bulgarian Ministry of Finance on behalf of the Mol in 2009 and 2010, utilising EU financial aid provided through the Schengen Facility Aid Programme. According to information released by the Bulgarian government at the time of the ceremony, the total price was more than €29 million (\$35.5 million).



The AW139 was the first helicopter flown by SASU pilots to feature an advanced avionics outfit, including, among others, a sophisticated autopilot, large cockpit displays and dual FMS. The spacious cabin allows a police sniper team to provide fire support from the air.



sentinels

Both types feature similarly extensive mission equipment for day and night surveillance and patrol. This includes: FLIR Systems' Star Safire HD day/night sensor payload; NVG-compatible cockpits; moving map displays; search/weather radar; a Spectrolab SX-16 searchlight; external loudspeakers; a digital video downlink and video recorder; dedicated mission consoles for a surveillance system operator; and a sophisticated integrated radio suite for tactical communications and airborne command and control functions.

In addition, both the AW109 and AW139 are fitted with flotation bags for emergency water landings, and the latter also has a double rescue hoist, rappelling rings, an enhanced ground proximity warning system and TCAS.

The ground end of the downlink comprises a fixed receiver station for TV and IR images, audio and GPS information, equipped with a 20in HD display, as well as vehicle-carried briefcase receivers supplied by UK company Enterprise Control Systems.

The three new helicopters join another AW109E Power – also owned by the CDBP – delivered in March 2010. This machine, which has the same configuration as the SASU's other AW109s, albeit

without the Star Safire HD, has been leased to Aviodetachment 28, Bulgaria's government air transport unit. Once this arrangement ends in mid-2013, it will be reincorporated into the SASU fleet.

Milen Penev, the Bulgarian Border Police's deputy director, explained that while the SASU is currently able to only operate during the day, the organisation plans to carry out an NVG training programme in the near future. Providing skilled instructor pilots from other EU states is Frontex, the European agency responsible for external border security, exercising coordination of the activities of national border guard services and ensuring the security of the union's borders with non-member states.

Building experience

Four NVG training events for the SASU are being funded by Frontex. These are slated to be carried out in 2012, with SAR training also planned to be undertaken next year. The SASU has purchased Bulgarian-made Optix Diana A aviator NVG sets, and two of its pilots already have NVG experience accumulated during their military careers before they joined the police in mid-2010.

‘Bulgaria was slated to join the Schengen zone in 2011, although this has been postponed.’

All the flying carried out by Bulgarian Border Police helicopters is done under military rules, and their airworthiness falls under the auspices of the Bulgarian MoD's newly created military aviation authority. Despite their sophisticated mission suites, both types have proven easy to support, demonstrating good reliability so far.

The SASU is headed by Chief Inspector Ivan Denev, an experienced ex-Bulgarian Air Force helicopter and fixed-wing pilot and commander, with more than 3,000 flight hours under his belt. All SASU pilots, and most of the technicians, are ex-military personnel who flew or maintained Mi-14, Mi-24, AS532 Cougar and/or Bell 206 helicopters during their careers.

The backbone of the SASU flight crews was formed by an initial cadre of five ex-military ➔

aviators, who received their type rating training on the AW109E and AW139 at AgustaWestland's Alessandro Marchetti Training Academy in Sesto Calende, near Milan, in the second half of 2010. In 2011, they accumulated significant in-country flying experience thanks to the intense training and operational activity carried out at Bezmer, with two receiving instructor ratings.

Training of new SASU pilots continued in 2012, with the service employing a large group of ex-military aviators in a bid to be capable of sustaining a 24/7 'quick reaction alert' at several key locations alongside Bulgaria's non-EU borders.

SASU personnel training this year included a significant project for improving air surveillance capabilities, utilising the know-how provided by the Aviation Group of the Federal Police in Germany, as the fledging Bulgarian unit had little or no experience in the border protection role.

This EU-funded project, which culminated in an exercise held in June, introduced a new concept of operations to the SASU, strongly influenced by German experience. It calls for three main types of operational sorties – E-1, E-2 and E-3 – to be undertaken by the unit.

E-1 is an urgent mission, prompted by a developing emergency situation on the border and using a helicopter on standby at an FOB ready to provide air support to surface patrol forces. E-2 is a routine scheduled patrol mission, while E-3 calls for undertaking reinforced surveillance within a predesignated sector, looking for signs of illegal activity, such as unauthorised border crossings or smuggling.

Working together

According to Penev, the joint Bulgarian-German training project was aimed at integrating SASU operations within the overall border protection effort, working in a coordinated manner with ground and sea forces.

The final exercise, held in the first half of June, covered three different scenarios on the land border and another carried out at sea. All were considered representative of the vast majority of border protection missions that the helicopters are going to be utilised for in the near future.

The first of the land scenarios, taking place on the Turkish border, saw the diversion of an airborne helicopter while on a routine patrol to react to an incursion detected by the ground sensors of the integrated border surveillance system. The helicopter was re-tasked in the air to detect and track a group of illegal immigrants using its sensor payload, down-linking the real-time video image to the regional coordination centre, which also controlled operation of the surface patrols despatched to apprehend the perpetrators.



The lone AW139 is set to be used for SAR and other specialised law enforcement and air support applications requiring several people on board.

'All the flying carried out by Bulgarian Border Police helicopters is done under military rules.'

The second scenario saw the search, detection and tracking of a car that had managed to escape inspection at the Lesovo border checkpoint. The search was carried out by a helicopter kept on standby at an FOB. The third was the most complex, and involved both the AW109 and AW139 to counter the border crossing of a large group of illegal immigrants.

The former helicopter was scrambled to search for the group using its sensor payload, and transmit a live video feed to the ground control and command facility, while the larger AW139 was utilised to deliver an airborne detention party to the crime scene to pursue and apprehend a part of the group.

Meanwhile, the sea scenario called for supporting border protection vessels during an inspection of two fishing boats – one Turkish and one Bulgarian – suspected of ferrying illegal immigrants, with both the AW109 and AW139 being called into action once again. The smaller

The AW109's operator console, with a 20in HD display for the image derived from the sensor payload and the moving map.



helicopter was used for tracking the suspect ships and sending live video images to the border police vessels, while the AW139 deployed a sniper team covering the boarding party, which was despatched to carry out an inspection of the ships and apprehend the illegal immigrants.

Homeland security

In addition to core border patrol missions, the SASU helicopters are also considered assets of the Bulgarian MoI, and have already been used on a few occasions to enhance law enforcement capabilities throughout the country. Both the AW109 and AW139 can be deployed on a number of homeland security missions on behalf of other MoI directorates, plus other ministries and government agencies in Bulgaria.

The most prominent of these non-core missions include: fire monitoring and mapping; rapid transportation of the MoI's 'Red Berets' counter-terrorist unit; use as airborne sniper platforms; highway monitoring; SAR; and detecting marine pollution.

The plan for the SASU's near- to mid-term development foresees construction of a modern base, including maintenance hangars and an administrative building, at Sofia, utilising EU money that is being provided under the External Borders Fund facility.

The Sofia-based helicopters are responsible for patrolling the Serbian and FYROM borders alongside a host of other support missions, using an FOB at Kyustendil. Bezmer will be maintained as a secondary permanent SASU base, responsible for operations on the Turkish border and the Black Sea coast, with two FOBs established in Elhovo and Burgas.

Bulgaria has been an EU member since 2007 and was originally slated to join the Schengen zone in 2011, although acceptance has since been postponed. Notwithstanding this, its borders with non-EU states, the Danube and the Black Sea are considered the outer borders of the EU.

The new helicopters provide support to the overall border protection effort against illegal migration, smuggling of goods and drugs and all the other forms of trans-border criminal activity that Bulgaria may face. **RH**



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Born again

The sale of surplus military equipment for civilian needs is a huge business, particularly in the UK and US. While most would imagine that this merely extends to old vehicles, uniforms and the odd mess tin, even helicopters have increasingly become available.

Types such as the H-1 Huey, H-58 Kiowa and the Westland-built Aérospatiale Gazelle are in high demand on the civil market, capable of delivering impressive performance at a relatively low price compared to a new-build aircraft.

Purchasing an ex-military helicopter has both pros and cons. Ultimately, it depends on how the aircraft is to be employed in its new-found civilian guise. In the US, it is typical for such machines to find their way back into the uniform of

one of the many federal or state agencies around the country, serving in the fight against crime or natural disaster.

Complexity is rarely an issue, and a wide range of aircraft have managed to find their way into civilian hands, often carrying out tasks that no helicopter purposely built for commercial operation would be likely to carry out – heavy lifting or utility work, for example.

Rigid regulations

In the UK and Europe, regulations are far stricter, with only a handful of ex-military helicopter types being made available. Their use is often limited to private flying, exhibition or air show demonstration work.

One of the biggest challenges is getting the aircraft from the military onto the civilian register, and this can be more or less problematic depending on the complexity of the helicopter. In the US, the vast majority of transfers are to domestic government agencies. Currently, hundreds of police forces around the country are making use of former US Air Force, US Marine

Corps and US Army helicopters operating under 'public use' rules.

This effectively means that, as long as the organisation in question is not using the aircraft for commercial purposes or competing with commercial operators – such as carrying persons or property for 'compensation or hire' – it does not fall under the normal rules of civil aviation or require an FAA airworthiness certificate, known as Form 8130-7. This document is issued by a representative of the FAA and gives a civilian aircraft its legal authority to fly, guaranteeing that it meets all applicable maintenance and airworthiness standards. The public use rule makes the process of transferring relatively straightforward.

Those operators not flying under public service rules can fly these helicopters in the 'experimental' category, which is issued to aircraft operating without a type certificate or one not conforming to its type certificate but in a condition for safe operation.

Currently, there are more than 450 OH-58s and around 700 different Bell UH-1 variants in

'People have purchased the Gazelle over buying a new EC120 because it is a better performing aircraft.'

Purchasing ex-military helicopters for civil applications is becoming an increasingly common practice. However, there are many restrictions in operating such machines, finds Tony Osborne.

A large number of ex-military OH-58s (left) have entered service with law enforcement agencies across the US. It is unlikely that, as army Black Hawks are retired, they will find a role with such agencies given their high cost of operation, although several do serve with Customs and Border Protection (right). (Photos: RH Photo Library/CBP)



civilian use across the US, according to a search of the FAA's registration database. Only a handful of both types actually fly in the hands of private owners or operators – the vast majority operate with government agencies.

'Most of the ex-military aircraft have been very well maintained by the military and are in very good condition,' said David Brigham, president and managing director of United Rotorcraft, now part of the larger Air Methods company. 'These aircraft are inspected and can be upgraded with the latest avionics and mission equipment.'

Companies such as Northwest Helicopters, based in Olympia, Washington, refurbish UH-1s that have emerged from the boneyard for a range of customers, including law enforcement and utility operators.

As well as the phenomenal number of Kiowas and Hueys, there are other examples, including Erickson Aircranes rebuilt from ex-US Army CH-54 Tarhes and the Los Angeles County Sheriff's Department's use of former US Navy H-3 Sea Kings – recently replaced by a trio of Super Pumas.

Sea change

There are also large-scale efforts being undertaken by the US State Department, which is purchasing substantial numbers of H-3s and CH-46 Sea Knights to conduct missions overseas. The department is also funding a modernisation effort for the latter aircraft that could include upgrades such as a glass cockpit, an optimised centre of

gravity, increased payload and crash-attenuating seats in the cabin.

Meanwhile, the S-61T Triton programme, currently being undertaken by Sikorsky, sees the company recycling former military Sea Kings, including several recently from the Danish Air Force.

These machines are being rebuilt in conjunction with Carson Helicopters, with new composite

main rotor blades, wiring harnesses and updated avionics. Recent reports also suggest that some of these State Department aircraft could be re-engined with the Russian-made Motor Sich VK-2500 engine that powers the Mi-17 in a bid to improve the Sea King's hot and high performance, and possibly reduce the need for US government agencies to buy new-build Russian helicopters. ➔

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The Washoe County Sheriff in Nevada uses a pair of ex-US Army OH-58s and a single HH-1H for its work around the Reno area. (Photos: author)



The UK Ministry of Defence (MoD) has been gradually selling off its once-enormous fleet of Westland-built Gazelle light observation helicopters. Developed in conjunction with French manufacturer Aérospatiale, the Gazelle was aimed at both military and civil markets. While the latter version was widely certified, it was the former that sold in greater numbers.

'The Gazelle is a hot ship in terms of performance,' said Hossein Seylani, engineering director at MW Helicopters, based at Stapleford aerodrome in Essex, England. 'It's like the sexy Ferrari compared to the Mondeo that is the JetRanger. Pilots like the Gazelle because it is very powerful and fast in the cruise. We find a lot of people who have flown the type in the services want one because it is what they learnt to fly in and they appreciate its capabilities. Some people have purchased the Gazelle over buying a new EC120 because it is a much better performing aircraft.'

Large numbers of Gazelles entered service with the UK military, but its use has been scaled back considerably, leaving many surplus to

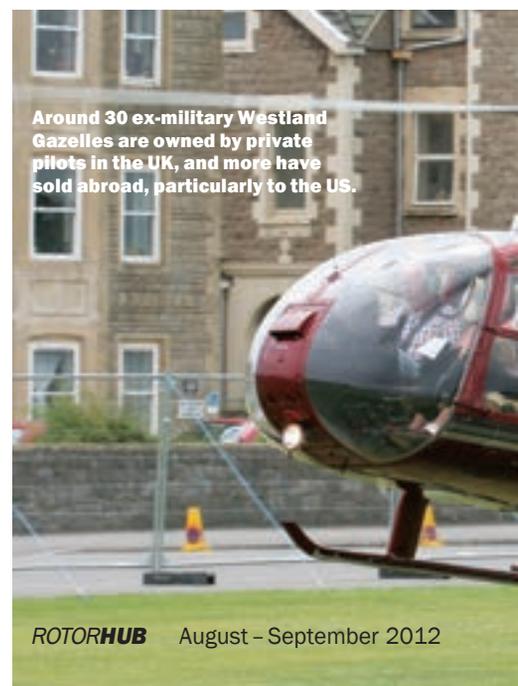
requirements. As a result, several maintenance companies are offering their services to ensure the aircraft can be put onto the civil market.

More than 30 ex-MoD Gazelles are operational with owners around the UK, while others have found their way to Africa and North America. MW Helicopters holds CAA E4/M5 approvals to provide initial certification and scheduled/unscheduled maintenance services for ex-MoD Gazelles. The company has already prepared several aircraft for transfer onto the civil register and at the time of writing working was on a further three.

Non-commercial use

In the UK, ex-military aircraft are allowed to fly on the UK civil register under a 'permit to fly', which means the owners are not allowed to undertake any commercial work with the aircraft. The permit is given because these aircraft are not eligible to hold a certificate of airworthiness due to never being type-certificated, or support for the aircraft being withdrawn by the type-certificate holder.

Being granted the permit, however, is a huge challenge and involves engineers such as Seylani gathering historical data and paperwork on the



Around 30 ex-military Westland Gazelles are owned by private pilots in the UK, and more have sold abroad, particularly to the US.

‘One of the biggest challenges is getting the aircraft from the military onto the civilian register.’

aircraft so that a full history of its maintenance and modifications can be made.

Maintenance will usually be conducted through a similar schedule to that developed for the military. In the meantime, engineers have to carry out a detailed inspection of the aircraft and remove any military-specific equipment on board. More than 1,000 component checks or changes are made to meet the permit to fly rules.

‘The permit to fly applies to that individual aircraft,’ explained Seylani. ‘There is no single rule for all ex-military Gazelles. What you find is that many of these aircraft have undergone lots of modifications – less so on the ones used for training, but the ex-army ones have been fitted with extra radios, camera, sights and lasers over the years.’

Once the paperwork has been approved, the aircraft has to undertake an air test to ensure there are ‘no adverse operating or handling characteristics’. This flight is carried out by a CAA test pilot or someone approved by the authority to conduct such trials. Once issued, the permit to fly is non-expiring, but will be revalidated by a certificate of validity, conditional upon completion of periodic maintenance, inspections and checks.

Those owners wishing to buy ex-military Gazelles benefit from being able to use surplus parts from the MoD and new components produced by

Eurocopter, which continues to support civil-certified Gazelles. As well as 30 or so ex-military examples, there are also a handful of Yugoslav-built Gazelles on the Serbian YU-register in the UK, on top of standard civilian-certified aircraft.

MW Helicopters has recently taken delivery of 30 former MoD Gazelles, and is now building up their histories in preparation to export those which can operate on a permit to fly to South Africa, leaving a few surplus examples.

Other former British military helicopters that have found their way into civilian hands include the Westland Scout and its naval version, the Wasp. However, their numbers are diminishing, with only around ten left in the UK due to an apparent increase in price of spares, underlined by some critical parts for the type being no longer manufactured.

Evolving markets

One of the big questions is how the market will evolve in the coming years, and it seems unlikely that the current fleet of US Army helicopters will be available to purchase as surplus. The idea of US police departments operating UH-60 Black Hawks seems rather fanciful, even if agencies such as US Customs and Border Protection already do. Some aforementioned police departments have enjoyed a recent boon of relatively low-cost re-capitalisation.

Recent examples reported in the news included small-town SWAT teams purchasing a range of tactical weapons, Humvees and even armoured vehicles. With the number of surplus OH-58s and UH-1s diminishing and the costs of parts rapidly increasing, it is possible that forces may have to look to the new or commercial second-hand market for aircraft in the future. **RH**



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Playing catch-up

Rega's AW109SP Da Vinci rescue helicopters are fitted with EVS systems to improve their all-weather capability in the Swiss Alps. (Photo: Rega)

The idea of synthetic and enhanced vision systems for helicopters has been around for six decades, but it is only in recent times that they have become more prevalent. Peter Donaldson finds out why.

Sometimes, technology runs ahead of our ideas about how we can use it – personal computers and the internet being obvious examples. Things do not always happen that way, however, and sometimes ideas run far ahead of technology.

Synthetic vision falls firmly into the second category, with the original conceptual research beginning in the 1950s, as Garmin's avionics product manager Bill Stone pointed out to *RotorHub*.

'The problem statement really has not changed – how can we replicate day VFR in night,

IMC [instrument meteorological conditions] or brownout conditions?' he explained. 'It was in the '50s that JANAIR [the Joint Army-Navy Aircraft Instrument Research project] started initial studies as to how to replicate that day VFR view.'

He argued that the elements needed to do this are simple – aircraft position and trajectory information and a database of terrain and obstacles, along with computers to meld them and displays to show them to the pilot – although six decades ago, computers weighed tons, cost millions and ran slowly, and the word 'database' had yet to be coined.

Contemporary costs

Now, certified technologies doing all those things are available at prices that make them increasingly attractive. Synthetic or enhanced vision systems for helicopters are either available today or in advanced stages of development by many leading companies, including BAE Systems, Cobham, Elbit, Euroavionics, Garmin, Honeywell, Max-Viz, Rockwell Collins and Thales.

It is worth noting the distinction that synthetic vision systems synthesise a virtual view of the outside world and the aircraft's relationship with it, while enhanced vision systems involve sensors that penetrate darkness and obscurants. The most sophisticated systems integrate both.

Cobham offers the Synthetic Vision Electronic Flight Information System, featuring 3D terrain, traffic and towers, a helicopter terrain awareness and warning system (HTAWS) and 'highway in the sky' and hover vector symbology.

Elbit Systems of America's Kollsman division offers the Enhanced Vision System (EVS) II, which uses a thermal imager to penetrate darkness, smoke, haze, rain, fog and other low-visibility conditions. Working with both head-up displays (HUDs) and head-down displays, this system can be fitted to both helicopters and fixed-wing aircraft, says the company.

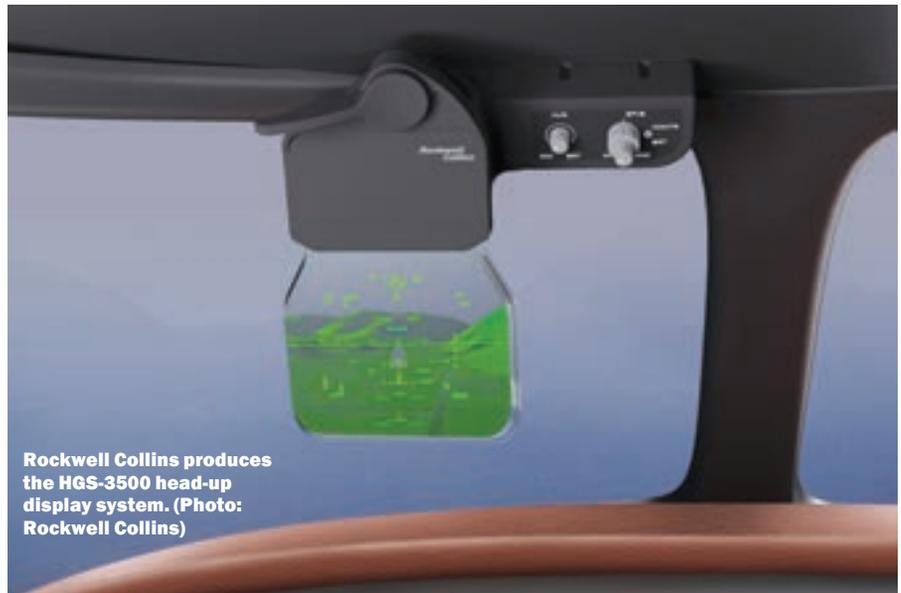
Euroavionics' EuroNav 7 is the first member of the EuroNav product line to support synthetic vision, using dual-core processor technology to generate 3D graphics. EuroNav systems have depicted terrain databases for many years, with dynamic terrain warning being a standard function for more than a decade. Now, it has been adapted for rotary-wing aircraft and tailored to DO-309 Minimum Operational Performance Standards to obtain HTAWS TSO-C194 certification, says the company.

In mid-May, Max-Viz announced receipt of an EASA supplemental type certificate (STC) for its EVS-1500 IR enhanced vision system on several Eurocopter EC135 models, including the T1, T2, T2+, P1 and P2. The system is already operational on an EMS-configured EC135 owned by Hélicoptères de France, which serves the hospital in Alençon, Normandy.

Rega (Swiss Air Rescue) operates 11 EVS-equipped AgustaWestland AW109s, while LPR, Poland's government-owned medevac agency, has equipped its 23 EC135s with the EVS-1500. The system also has EASA approval for Bell's Model 206, 212, 407 and 412. An EASA STC for the Dauphin is also in progress, says Max-Viz.

Leap forward

These systems represent the first operational stage of the technology, but a second generation is in gestation.



Rockwell Collins produces the HGS-3500 head-up display system. (Photo: Rockwell Collins)

'Since we did those first test flights, we have had a lot of attention from customer communities.'

'From the point of view of the pilot's increased situational awareness, the technology has evolved from a 2D display presentation to a 3D view, incorporating an increasing number of databases,' Mark Hartnett, senior programme manager at BAE Systems, told *RH*.

'In many applications, this 3D view may be presented as a conformal or real-world stabilised image, overlaid on the user's line of sight using HUDs or helmet-mounted displays [HMDs]. Pilots are looking for a fusion of the information contained in geo-registered geodesic databases, various sensors and real-time positional data.'

Such advanced technologies often emerge from military requirements, earn their spurs on the battlefield and trickle down to the civil market, but the story is more complex with synthetic vision, and the civil market is ahead of the military – a lead that Hartnett quantifies.

'In the military market, the technology is available up to a Technology Readiness Level [TRL] of 6, where the model or prototype has been demonstrated in a relevant environment,' he said. 'I estimate that commercial world synthetic vision is at TRL 9, as it is operational today.'

Rockwell Collins, which has been developing synthetic vision internally for many years, encountered more initial conservatism in the military than in civil aviation, as Doug Schoen,

rotary-wing business development manager at the company, pointed out.

'We always had our eye on the military market as well, but there did not seem to be a lot of traction immediately,' he said. 'So Rockwell Collins moved forward in the business and regional jet area, and our first fielded version is on our Pro Line Fusion cockpit. On the military side, we had been demonstrating it to particular customers, and over the last couple of years we finally started to get a little more traction – a lot of which was around operations in degraded visual environments.'

The driver here was the US Army's ongoing efforts to tackle the brownout problem, a contributor to an operational accident rate in the Iraqi and Afghan theatres that has caused far more losses of aircraft and occupants than enemy fire. There is clear synergy here with the goals and methods of the International Helicopter Safety Team, which is committed to reducing the civil helicopter accident rate by 80% by 2016 (see p44).

On the ground

One of the biggest changes needed for helicopter operations close to the ground is the detail required of the terrain and obstacle databases, Schoen pointed out. Avoiding the proprietary route – now deeply unpopular with the US Department of Defense – Rockwell Collins stuck with sources such as digital terrain elevation data and an obstacle database that the government supplies to the National Geospatial Agency. 'Our approach has been to use whatever database the customer wants to use,' added Schoen.

The company has also worked to provide the capability without adding any new avionics boxes to the Common Avionics Architecture System ➔



EVS input can be seen on the Garmin G500 display. (Photos: Garmin)

(CAAS) on the test Black Hawk belonging to the US Army's Aviation Applied Technology Directorate (AATD), because size, weight and power are 'huge constraints' on anything you put on a helicopter, according to Schoen. 'We have flown synthetic vision several times within the architecture of the CAAS,' he noted.

Rockwell Collins has a cooperative research and development agreement with the AATD, under which they jointly installed half of a CAAS cockpit in the Black Hawk test hack. This enables the company – and any other industry partners which feel the need – to experiment with the aircraft within the confines of the CAAS architecture, without affecting its certification. The right side of the cockpit has its certified analogue gauges, and the left side has a CAAS installation with three MFDs.

According to the company, the synthetic vision system has been tested in many of the challenging low-altitude flight profiles commonly employed by military pilots in today's demanding tactical environments.

'Since we did those first test flights, we have had a lot of attention from customer communities interested in getting synthetic vision,' continued Schoen. 'So I think the next step is the integration of sensors.'

Synthetic synergy

This gels with the contract from the US Defence Advanced Research Projects Agency announced in June, under which Rockwell Collins is to develop the synthetic vision avionics backbone for next-generation helicopter operations under the Multi-Function Radio Frequency (MFRF) programme. The company is teamed with BAE Systems on the first two phases of the \$5.1 million contract, which contains an option for a third phase that would bring its value to \$6 million.

Under the MFRF contract, Rockwell Collins is to develop a 3D synthetic vision system for use with a multifunction radar, which is almost certainly the sensor used by BAE Systems in its Brownout Landing Aid System Technology system. Rockwell Collins will fuse radar data with terrain and obstacle data to produce an integrated 3D view of the environment. Schoen views this as a continuation of the company's CAAS development work.

He said: 'CAAS is sort of an avionics backbone in itself – all the ancillary systems already plug in to this CAAS network architecture through Ethernet. Primarily, what we are working on is a sensor-agnostic interface for any sensor that can augment the synthetic vision within the avionics system, and that is really what we are under contract for.'

Another key element of Rockwell Collins' philosophy for synthetic vision is to replicate the situational awareness that pilots gain from today's 2D displays in 3D, providing more than just a synthetic picture of the terrain. The idea, said Schoen, is to populate that 3D terrain picture with information from obstacle databases and sensors, threat warning receivers and blue force tracking systems, among others.

The civil analogues of such military information might include helipads, surveyed landing sites and hazardous areas, all helping the pilot know where to fly and where not to.

As synthetic vision is best suited to short-range situational awareness, Schoen does not expect it to

replace the 2D map. 'We feel we will always have some sort of digital map for more long-range flight planning. But that 3D view will become the primary flight display.'

Smaller side

Unlike Rockwell Collins, Garmin is active at the smaller end of the general aviation market, which includes light helicopters, with the company fielding its first synthetic vision systems about four years ago, with several thousand in operation. Its Helicopter Synthetic Vision Technology is now available as an option with the G500H dual-screen primary flight display.

In civilian use, synthetic vision is only certified as advisory information, emphasised Stone, but it is nonetheless extremely compelling because humans are visual creatures who react instinctively to what they see coming at them.

'I think it is well recognised that even though it is advisory, pilots will make decisions based on the data presented to them – even though they are not supposed to. So one of the requirements to present synthetic vision on certified civil avionics is that it has to be accompanied with forward-looking terrain alerting – that is mandatory.'

For the future, Hartnett expects the technology to evolve regarding how information is presented to the pilot. 'Current technologies are limited to head-down displays, smaller field-of-view displays and current generation HMDs,' he said. 'The trend is to increase display fields of view by offering high-definition, full-colour imagery presented as a mix of conformal – real-world stabilised – and non-conformal – display-fixed imagery – on both HUDs and HMDs.'

Suggesting that cues need not always be visual, he continued: 'The goal is to provide the information in a flexible and intuitive form that is linked to the user's needs, especially during high-workload events. Therefore, alternative forms of information feedback, including tactile cueing and 3D audio, are being adopted to provide the user with easy-to-assimilate information and decrease visual overload.'

For the civil market, however, cost will always be a major driver. 'The head-down displays have really only been affordable at the lower end of the market for ten years, and they are becoming very affordable now,' added Stone. 'So I think with HUDs and HMDs, we are going to see similar things. HMDs are fascinating to me, but they require so much infrastructure on the aircraft to be effective.'

Looking to the future, he draws a parallel with anti-lock braking in cars – three or four decades ago, ABS was only available in the most expensive cars, but now it is difficult to buy one without it. 'In my crystal ball, I would see that with synthetic vision,' he concluded. **RH**



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Fairchild-Hiller (Rogerson) FH-1100

Based on Hiller's original OH-5A helicopter developed for the US Army's Light Observation Helicopter competition, the FH-1100 was updated and refined for the civil market, with 246 being produced before production ended in 1974. Development was later taken over by Rogerson Hiller, which attempted to develop a light attack version for the military market called the RH-1100M, but this venture was unsuccessful. In 2000, the type certificate was purchased by FH1100 Manufacturing Corporation, which conducts remanufacturing and training, but has not received a production certificate for the FH-1100.

Weights

Maximum Take-off Weight:	3,200lb (1,452kg)
Useful Load:	1,335lb (606kg)
Empty Weight:	1,515lb (687kg)
Maximum Fuel Capacity:	404lb (184kg)

Powerplant

One Rolls-Royce 250-C20B turboshaft producing 420shp (313kW), de-rated to 274shp (204kW) and driving a two-bladed main rotor and two-bladed tail rotor.

Performance

Maximum Speed:	110kts (203km/h)
Maximum Cruising Speed:	105kts (195km/h)
Economical Cruising Speed:	106kts (196km/h)
HIGE:	17,000ft (5,200m)
HOGGE:	12,000ft (3,700m)
Service Ceiling:	17,300ft (5,000m)
Range:	303nm (560km)
Maximum Endurance (no reserves):	3hr
Maximum Rate of Climb:	1,600ft per min

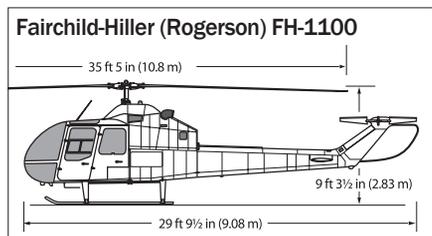
External Dimensions

Main Rotor Diameter:	35ft 5in (10.8m)
Fuselage Length:	29ft 9½in (9.08m)
Overall Length:	41ft 3in (12.57m)
Fuselage Width:	4ft 4in (1.32m)
Height:	9ft 3½in (2.83m)
Skid Track:	7ft 2¾in (2.2m)

Internal Dimensions

Cabin Width:	N/K
Cabin Height:	N/K
Cabin Length:	N/K
Cabin Floor Area:	N/K
Cabin and Baggage Volume:	N/K
Baggage Compartment Volume:	10.5ft³ (0.30m³)

Maximum Seating: Four people



Famà Helicopters KISS 209M

The Keep it Stupidly Simple (KISS) is a lightweight, turbine-powered helicopter developed in Italy by former motor racing driver Nino Famà. The Model 209M is the production variant of the kit helicopter built by the company. The aircraft features a carbon-fibre fuselage, and clients can choose between a retractable wheeled landing gear or skids. The aircraft can be delivered as a kit or completed. First flight took place in 2009 and examples have been sold to private owners in Italy and France.

Weights

Empty Weight (Skid Gear):	634lb (288kg)
Empty Weight (Wheeled Gear):	679lb (308kg)
Maximum Take-Off Weight:	1,720lb (781kg)
Useful Load:	1,125lb (511kg)
Maximum Fuel Capacity:	257lb (117kg)

Powerplant

One Titan turbine engine producing 162shp (120kW), driving a teetering two-bladed main rotor and a two-bladed tail rotor.

Performance

Maximum Speed (Skid Gear):	97kt (180km/h)
Maximum Speed (Wheeled Gear):	105kt (195km/h)
Cruising Speed (Skid Gear):	90kt (168km/h)
Cruising Speed (Wheeled Gear):	100kt (185km/h)
HIGE:	12,400ft (3,800m)
HOGGE:	10,150ft (3,100m)
Service Ceiling:	N/K
Range:	178nm (330km)
Maximum Endurance (no reserves):	3hr
Rate of Climb:	2,100ft per min

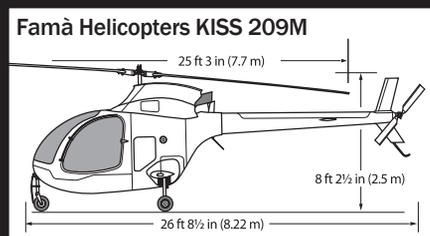
External Dimensions

Rotor Diameter:	25ft 3in (7.7m)
Fuselage Length:	26ft 8½in (8.22m)
Overall Length:	N/K
Disc Area:	N/K
Fuselage Width:	N/K
Height:	8ft 2½in (2.5m)
Fuselage Ground Clearance:	N/K

Internal Dimensions

Cockpit Width:	4ft 1in (1.25m)
Cockpit Height:	3ft 2½in (1.28m)

Maximum Seating: Two people



Guimbal Cabri G2

Former Eurocopter engineer Bruno Guimbal set up Hélicoptères Guimbal in 2000 to begin production of his piston-engined light helicopter design. The first Cabri G2 flew on 31 March 2005 and the type achieved EASA certification in December 2007. The first production examples reached customers in September 2008. The aircraft features an all-composite airframe and a seven-bladed fenestron tail rotor, which has helped reduce the type's noise levels. Around 30 aircraft have been constructed, with deliveries mainly to private operators and flight schools.

Weights

Maximum Take-off Weight:	1,542lb (700kg)
Useful Load:	N/K
Empty Weight:	925lb (420kg)
Maximum Fuel Capacity:	275lb (125kg)

Powerplant

One Textron Lycoming O360-J2A piston engine producing 145shp (108kW), driving a three-bladed main rotor and seven-bladed shrouded tail rotor.

Maximum Continuous Power (MCP): 145shp (108kW)

Performance

Maximum Speed:	130kt (240km/h)
Maximum Cruising Speed:	100kt (185km/h)
Economical Cruise Speed:	90kt (166km/h)
HIGE:	5,000ft (1,500m)
HOGGE:	N/A
Service Ceiling:	> 20,000ft (>6,000m)
Range:	380nm (700km)
Maximum Endurance (no reserves):	5hr 40min
Rate of Climb (MCP):	1,450ft per min
Temperature Limitations:	Min: -40°C (-40°F) Max: 50°C (122°F)

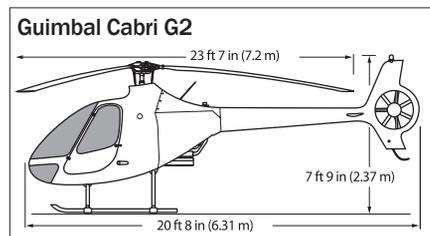
External Dimensions

Rotor Diameter:	23ft 7in (7.2m)
Fuselage Length:	20ft 8in (6.31m)
Overall Length:	26ft 5in (8.05m)
Fuselage Width:	4ft 1in (1.24m)
Height:	7ft 9in (2.37m)
Ground Clearance:	3ft 11¼in (1.2m)

Internal Dimensions

Cabin Width:	4ft 5in (1.35m)
Cabin Height:	3ft 9in (1.16m)
Cabin Length:	7ft 6½in (2.30m)
Cabin and Baggage Volume:	103.82ft³ (2.94m³)
Cabin Floor Area:	32.29ft² (3m²)

Maximum Seating: Two people



No blackout required

Kim Harris of Aviation Specialties Unlimited re-examines some preconceptions about using NVGs and searchlights, and finds that military best practice doesn't always translate well to civilian EMS operations.



'IR light can damage the eyes of ground personnel looking up at the helicopter.'

- increases safety during operations near other aircraft;
- greatly aids obstacle detection during all moon phases;
- aids pilot and crew when working over brightly lit areas; and
- decreases pilot and crew workload during most operations.

Effective searchlight use is not intuitive, but requires training to gain maximum safety and situational awareness. Let's keep the lights on out there.

Kim Harris is director of operations at Aviation Specialties Unlimited.

The editor welcomes *RotorHub* reader contributions for consideration on the Collective Pitch page. Submissions should be in the region of 750 words and offer comment and reflection on a particular issue affecting the civil helicopter industry. *RotorHub* reserves the right to edit copy for style, length or legal reasons.

I recently completed NVG training for an EMS base with a new aircraft and four pilots new to night flying. During the training, a common question was asked regarding NVG and aircraft searchlights: 'Will I still be able to use the normal white searchlight, or am I restricted to the IR light only?'

The short answer is, of course, you will be able to use your white light, and unless you have a tactical reason to remain undetected during your approach to an accident scene, you will find very little (if any) use for your IR light.

The myth that states 'when using night vision goggles, an infrared light is superior to a standard white light', comes to us from military operations.

Collective wisdom

Understandably, for many years nearly all the collective wisdom about NVGs derived from the armed forces. The focus in combat operations using NVGs is to increase flight crew situational awareness through increased visibility, while remaining undetected and covert in the tactical environment.

Unfiltered light makes you an easy target, and those personnel have become very good at blacked-out operations, using an IR light only when necessary. They are excellent NVG pilots who can go anywhere and do any job blacked out.

Along with a great deal of valuable NVG experience and techniques, these pilots also brought with them the myth that IR lights work best with NVGs. And that is simply not true. The light disciplines and skills learned in the military or tactical environment simply do not carry over into civil aviation, where 'see and be seen' is absolutely essential for operational safety.

It is common knowledge that NVGs amplify any available light. Nothing new here – anyone who has taken off on a night with a full moon will

tell you that NVG flying simply does not get any better than this.

The red and the white

NVGs 'like' light and don't care what the source is. However, there is a commonly held belief is that IR is the most effective light that can be used with NVGs and that white light causes them to 'shut down' without providing any significant advantage. That is simply not true.

Some pilots will tell you that you can't use NVGs with white light without causing damage to the equipment. This is also incorrect. Light is light – IR light is simply a narrower spectrum of light, indiscernible to the human eye and which can only be seen by the NVGs. The goggles don't really 'care' about the spectrum, only the intensity.

IR searchlights are generally much less intense than a comparable white light source only because the spectrum is narrowed, making IR seem to be a better fit with NVGs. Because IR light is invisible to the naked eye and can only be seen by the goggles, it would be easy for a pilot viewing the source through NVGs to assume that IR is much better.

Another major issue with IR light is that it can damage the eyes of ground personnel looking up at the helicopter when it is landing. Because it is invisible, people can stare directly at the IR light without realising it. It is normal for ground staff to watch the aircraft during take-off or landing. Depending on the intensity and distance to the source, IR can cause eye damage in the form of retina burns if anyone was to stare directly into the light at close distances for extended periods of time.

Effective use of 'white' light during all NVG operations:

- significantly aids situational awareness for pilot and crew;

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