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Editor's Notebook

Paganini: Industry Back on Track by 2014

By Andrew Parker



aparker@accessintel.com

January is the month that features our Rotorcraft Outlook panel, where top CEOs in the industry provide insights into the coming year and beyond. I recently had a chance to interview American Eurocopter President & CEO Marc Paganini, with the full Q&A scheduled to appear in the February issue of *Rotor & Wing*. In the spirit of the outlook panel, here's a preview:

Q: How was business for the company in 2012 and what does the picture look like for 2013 and beyond?

Paganini: This year we're going to produce about 100 aircraft in Mississippi. Half of them are for the UH-72A Lakota program, the light utility helicopter (LUH) for the U.S. Army, while the remaining [AS350] AStar B3s and B2s are for the U.S. public services sector—representing a small increase over last year. The market has been a little better on the commercial side in the U.S. in 2012 compared to 2011. The prediction is about the same overall.

Q: What is the outlook for the commercial market?

Paganini: We expect the market to continue to grow on the commercial side. It started to rebound at the end of 2011 and this continued through 2012. We expect to get back on track by 2014 to the levels pre-financial crisis. Strong markets like EMS are driving the recovery. EMS is a market that's usually slow to grow, but there's a lot of fleet renewal [possibilities].

Replacing old BK-117s, old BO-105s, old Dauphins—this is driven by replacement and a little growth, but not strong growth.

The oil and gas market is very promising in the Gulf of Mexico. This year the activity has grown significant-

ly, and this is a market that will require large aircraft.

Police and law enforcement is slowly coming back. It's been one of the most important markets after the economic crisis because of the financial situations of the municipalities. Now the overall situation is improving a little bit, and we're starting to see some good opportunities in law enforcement, mainly for light-single engine aircraft but also a few for twin-engine helicopters.

For corporate/VIP, the year has not been too bad. It follows the economy and the profit of the companies, so hopefully the economy will continue to grow. It's not obvious yet but it's coming back slowly and we expect it to be active during 2013.

Q: How much does American Eurocopter plan to invest in R&D, outside of the parent company Eurocopter?

Paganini: At American Eurocopter our R&D is mainly going to the development of the prototype for [the U.S. Army] Armed Aerial Scout (AAS) program [with EADS North America]. All the development of this prototype and this partnership with Lockheed Martin was handled here in Grand Prairie.

We have also developed a new version of the LUH [UH-72A light utility helicopter] in the Security & Support (S&S) Battalion configuration for the Army National Guard. We are also doing STCs—that's what we do here in the U.S.

More and more, we are building up the capability to not only develop STCs but to do some design work, major modifications on aircraft, or for the first time we were given responsibility to do a prototype for Eurocopter.

The main R&D work in terms of development of new technology and programs, demonstrators, larger aircraft, is of course done in Europe, both in Germany and France. Today we remain in a plan that started in 2010 stretching out to 2014 where we are investing \$1.7 billion to do what I just said—we have launched the EC130 T2, the EC145 T2, and the EC175.

We are working on the X4 successor to the Dauphin, and we have this technology demonstrator the X³ (X-cubed), testing composite, new blades. We're also working on a diesel engine-powered helicopter.

Q: What was the feedback like from the X³ U.S. summer tour?

Paganini: Of course the operators like the speed, but what they also liked is that the speed was not a tradeoff against cost, because we say we're going to get 50 percent more speed but with an increase in life cycle costs of 20 to 25 percent. This is important because speed must be affordable, and this is why we decided to go to a speed in the range of 230 knots. We do not believe that going to higher speeds is what the market needs or is willing to pay for.

The second thing that was very important is that it's still a helicopter, and then if you want to go fast, you go fast. You don't lose any of the attributes of the helicopter, such as hovering, which is needed in many of the helicopter markets. Otherwise you go to fixed-wing. The combination of speed and classic capabilities of a helicopter were very well received, and the military pilots were impressed as well. 🚁

Read the full interview in the February issue of *Rotor & Wing* and online at www.rotorandwing.com 

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(Above) AgustaWestland AW169 No. 3 takes flight. (Below) Screen from an iCommand unit at Bell's MUMO lab. (Right) UK 42 Commando's Exercise Black Alligator in Twentynine Palms, Calif.

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Top industry leaders answer the questions: "What technological advancements do you anticipate will most impact helicopter operations in 2013; What issue or issues concern you most about the immediate and long-term future of the rotorcraft industry; and What is your company doing to improve safety in helicopter operations? How has your organization strengthened its training programs?"
Compiled by Rotor & Wing staff

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WHAT DO THE EXPERTS THINK?

- Ask questions to three experts on the topics of helicopter aerodynamics, AS9100 quality management systems audits and night vision goggle (NVG) certification at rotorandwing.com. Che Masters, certification engineer for NSF-ISR, discusses aerospace quality registration. Frank Lombardi, test and evaluation pilot, provides insights about the science behind helicopter flight. NVG certification expert Jessie Kearby fields questions about NVGs for both military and commercial uses.

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WEEK OF JANUARY 1:

- Digital edition of *Rotor & Wing* January 2013. Electronic version with enhanced web links makes navigating through the pages of *Rotor & Wing* easier than ever.

WEEK OF JANUARY 21:

- *Rotor & Wing's* Military Insider e-letter. Get the latest updates from helicopter defense companies around the world, from Military Editor Andrew Drwiega.

WEEK OF JANUARY 28:

- HOT PRODUCTS for Helicopter Operators—Latest in equipment upgrades, performance modifications, training devices and other tools for the rotorcraft industry.

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Rotorcraft Report

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■ MILITARY | VIP/HEAD OF STATE

NAVAIR Sets Ball Rolling (Again) for Presidential VXX Replacement

The U.S. Naval Air Systems Command (NAVAIR) has signaled the beginning of a new race to supply the next Presidential helicopter. The release by the Program Office (PMA-274) on Nov. 23 of draft request for proposal (RFP) for the Presidential Helicopter Replacement Program (VXX) contract had been expected and is likely to be followed by a formal RFP around mid-FY13, according to the NAVAIR advisory notice.

An industry day was scheduled at Patuxent River in Maryland in early December. The new VXX helicopters will replace the old Sikorsky VH-3D and VH-60N aircraft currently in operation with Marine Helicopter Squadron One.

The Lockheed Martin/AgustaWestland team won the last Presidential Helicopter competition with the US101 (VH-71 Kestrel) in January 2005, beating Sikorsky's S-92 Superhawk. The budget—originally set at \$1.7 billion—was blown away by cost overruns that exceeded \$3 billion over four years thanks to continual additions and alterations made to the original requirement. Nine US101s were actually built by the termination of the order in June 2009—four test vehicles followed by a further five aircraft. The total order envisaged was for 23 helicopters.

The VXX requirement calls for: “a survivable and dependable worldwide transportation capability and enables the strategic information superiority necessary to execute the duties of the President as the Commander-in-Chief, Chief Executive, and Head of State. The VXX will provide a comprehensive and secure communications capability to ensure connectivity between the President and U.S. government agencies or foreign governments, throughout the threat

spectrum, regardless of location. The VXX acquisition strategy is based on the integration of mature subsystems into an existing air vehicle.”

The NAVAIR statement further identifies that proposals should be built around “an existing, in-production helicopter platform.” It continues: “It is the government's desire to hold development to an absolute minimum on the VXX program and focus the program effort on integration of mature subsystems on a mature platform. While minor changes to the platform to accommodate integration of subsystems are inevitable, change to major components such as drive train, rotors, engines and basic structure is highly discouraged. In keeping with this approach, the offerors will be encouraged to not propose any design elements that contain immature technology or that might be deemed Critical Technology Elements (CTEs).”

Competition and the dwindling number of large of defense contractors can create bedfellows that were once rivals for the same contract. Sikorsky and Lockheed Martin were pitted against each other only a few years ago while trying to capture the prize of the initial VXX competition. Sikorsky was offering a version of the S-92 Superhawk transport and Lockheed Martin teamed with AgustaWestland to submit an American variant of the AW101 Merlin.

The competition—awarded to Lockheed Martin in 2005 before being cancelled in 2009 due to cost issues—was, at least in the view of the public, intense and hard-fought. While Sikorsky and Lockheed Martin were duking it out for the win, the two companies were working together, most notably in systems integration for the U.S. Navy's MH-60S

Knighthawk and MH-60R Seahawk rotorcraft programs. In fact, the two companies have partnered on different programs for almost four decades.

Two recently released GAO reports (11-380R and 12-380R) are designed to help the next iteration of the VXX competition avoid some of the pitfalls that eventually led to the cancellation of the initial VH-71 Kestrel program. Taking on some of the GAO lessons, the Navy, in its draft solicitation, is looking toward an off-the-shelf, FAA certified, rotary wing replacement for the long-toothed Sikorsky VH-3D Sea King helicopters currently serving the executive transport mission for the White House.

Of course, the special needs of a helicopter carrying the commander-in-chief will require that any current helicopter undergo somewhat substantial modifications. Sikorsky, with the S-92 currently flying 11 heads of state, was quick to point out, in a release, that the “S-92 helicopter is one of the few helicopters in the world designed to meet the FAA's rigorous safety standards (FAR29).”

Facing the S-92 in the VXX competition will be the AW101, this time offered by Northrop Grumman in partnership with AgustaWestland. A Boeing spokesman stated that the company was studying the Navy's proposal request and would analyze the requirements to see if either the CH-47 Chinook or the Bell/Boeing V-22 Osprey might be offered for the program. For a time, Boeing had entered into a licensing agreement with AgustaWestland with the AW101 specifically for VXX. All of these players are likely candidates in the Air Force CRH program as well. —By Andrew Drwiega and Todd Vorenkamp

■ PRODUCTS | R&D

Textron Systems and Bell/AAI Open Manned-Unmanned Research Lab



Shadow hardware-in-the-loop simulator at the Textron Systems and Bell/AAI research lab in Huntsville, Ala.

and collaboration lab, houses a number of technology development programs, including a maintenance trainer for the Shadow unmanned aerial system (UAS), Shadow hardware-in-the-loop simulator, an iCommand suite, ground control station simulators and Gray Eagle/Shadow desktop trainers. The site will also feature a Kiowa Warrior simulator to help develop MUMO cognitive skills. The company says the MUMO lab will help operators develop tactics, techniques and procedures. 𠄎

Bell Helicopter, Textron Systems and AAI—all subsidiaries of Textron Inc.—have opened a research lab in Huntsville, Ala. that will focus on systems integration and manned-unmanned teaming. The complex, which includes the Bell/AAI manned/unmanned operations (MUMO) capability development lab and the Textron Systems integration

■ COMMERCIAL | AIRFRAMES

Third AW169 Takes Maiden Test Flight

AgustaWestland continues to advance the development program for the AW169, as the third prototype has gone airborne for the first time from the manufacturer's facility in Cascina Costa, Italy. Test pilots accessed the helicopter's general handling and basic systems during a 35-minute initial flight. AgustaWestland plans to fly a fourth prototype in early 2013, with civil certification on track for 2014. The third prototype, which will undergo landing gear checks, cold weather trials, hot/high and climatic chamber testing, joins two others that lifted off for the first time in May and July 2012. AgustaWestland reports topping more than 100 flight hours in the program through late November. 𠄎

■ MILITARY | AIRFRAMES

Sikorsky Completes CH-53K Ground Test Vehicle

Progress in the ongoing development of the United States Marine Corps' (USMC) heavy lift helicopter replacement, the Sikorsky CH-53K, has been announced with the delivery of the prototype aircraft to the flight test team. This means that NAVAIR and Sikorsky pilots can begin the program of scheduled ground checks that will take place over the next year.

Production of the ground test vehicle (GTV) began in July 2011. It will undergo hundreds of hours of testing, the purpose of which is to "shake out the CH-53K helicopter's dynamic systems by thoroughly testing and measuring the performance of the rotor blades, transmission, and engines while the aircraft is tied to the ground," stated Michael Torok, Sikorsky's CH-53K program vice president.

Although the CH-53K program was conceived in 2003 with development work starting in 2005, it was not until 2010 that the main rotor blade and main gear box near were developed into maturity, states the Government Accountability Office (GAO) in its Assessment of Selected Weapons Programs issued in March 2012.

Four flight test helicopters will join the testing program during 2014-2015. There is still a distance to go on this program with the low rate production decision set for late summer 2015 and an initial operating capability (IOC) not expected before 2019. In 2008, USMC directed that the acquisition should increase from 156 CH-53Ks to 200 in line with an expected increase in marine numbers from 174,000



Sikorsky CH-53K ground test vehicle (GTV).

to 202,000. However, in August 2011 it was stated that USMC numbers could fall by 20,000 starting in 2015. The GAO reports that in the same month "the contract's schedule was re-baselined and several key production and testing events were delayed. For example, the delivery dates for the program's engineering development models were moved back and its first flight was delayed from 2013 to 2014." However, the announcement that the GTV is now ready was described as "an important point of transition" by Col. Robert Pridgen, program manager for heavy lift helicopters. "I am encouraged by the initial results of our testing at the component and subsystem level. Now we bring it all together. The GTV is our first dynamic system-level integration of those same components." Partners in the fuselage manufacture include Aurora Flight Sciences, ITT Excelis, GKN Aerospace and Spirit Aerosystems. —By Andrew Drwiega, Military Editor 𠄎

■ TRAINING | SIMULATORS

CAE Awarded Tactical Trainer Contract for RAN Sikorsky MH-60Rs



CAE Sikorsky MH-60R TOFT cockpit simulator. The Royal Australian Navy will purchase 24 MH-60Rs from Sikorsky with the first two deliveries scheduled for 2014.

In a spread of contracts valued at around \$70 million announced by global simulation and training organization CAE, there is one requirement for the development of two MH-60R tactical operational flight trainers (TOFT) for the Royal Australian Navy (RAN).

The RAN will buy 24 MH-60Rs from Sikorsky with the first two deliveries scheduled for 2014. The contract originates with the United States through the foreign military sales (FMS) program. According to Gene Colabattisto, group president for military products, training and services, CAE in the U.S. will act as the prime contractor and system design house. The TOFTs will be full-motion flight trainers and used to instruct aircrew while a separate weapons tactics trainer (WTT) will be used for rear crew sensor operator training. Based on systems already designed for the U.S. Navy, they can be operated independently or networked to enable the full flight crew to train together. The TOFT will incorporate a true electric motion system, motion seats, 220 by 60-degree Barco visual display, and a Medallion-6000 image generator.

Once ready in 2015, the two systems will be delivered to the RAN training base, HMAS Albatross near Nowra, New South Wales. This is the home base of the RAN Fleet Air Arm.

Team Seahawk, which supports the U.S. Navy in its MH-60R program, is comprised of aircraft OEM Sikorsky, mission systems integrator Lockheed Martin, engine manufacturer General Electric, sensor supplier Raytheon and training supplier CAE. Subsidiary CAE Australia will help to customize the system through its existing access to Australian-specific common databases (CDB) already developed by CAE Australia for other programs.

This training award may strengthen CAE's position as it awaits further developments of the Australian Defence Force AIR 9000 Phase 7 program, otherwise known as the Helicopter Aircrew Training System (HATS). This program should provide the Army and Navy with all its future rotary wing training needs, including live, synthetic and traditional classroom training. CAE is partnered with AgustaWestland and BAE Systems. —By Andrew Drwiega, Military Editor

■ CORPORATE | SERVICES

First 429 Leaves Bell Singapore Center

Bell Helicopter has handed over the initial 429 to exit its Singapore Service Center to PT Whitesky Aviation, which is based in Jakarta, Indonesia. The corporate-configured Bell 429 increases PT Whitesky's fleet to five helicopters, including another 429 and three Bell 407s. The Textron subsidiary launched the 160,500-square-foot Singapore facility in July 2012, offering training, completions, refurbishments, parts and other maintenance, repair and overhaul (MRO) services. PT's latest 429 comes with Bell's kit to boost the gross weight of the helicopter to 7,500 lbs.

Bell has also handed over the first 429 to an operator based in the United Kingdom. National Grid Electricity Transmission will use the helicopter for the inspection and maintenance of power lines. The 429 will undergo completions at Bell's European headquarters in Prague, receiving a package of equipment including SkyQuest display, L-3 Wescam MX-10 control unit and a Nano Flash recorder.

■ COMMERCIAL | ACQUISITIONS

Erickson to Acquire HRT Air Division

Under a non-binding letter of intent, Erickson Air-Crane has agreed to acquire the air logistics unit of Brazilian oil and natural gas operator HRT Participacoes em Petroleo. An independent holding company a group of geoscientists and engineers formed in 2004, HRT has a total of 14 helicopters, half of which are Sikorsky S-61s. The fleet also includes Bell 212s and Eurocopter AS350s. The agreement, which is subject to a 180-day approvals process, also calls for Erickson to supply helicopter support services to Rio De Janeiro-based HRT Group for up to three years, with an option to renew.

■ COMMERCIAL | AIRFRAMES

Ulan-Ude Delivers Mi-171 to Indonesian Mining Operator



Russian Helicopters

Airfast Indonesia Mi-171. Russian Helicopters has sold an Mi-171 to another Indonesian operator.

An undisclosed Indonesian mining company has acquired a medium lift Mi-171 from the Russian manufacturer, Ulan-Ude Aviation Plant. The aircraft pictured with the announcement bears the name of Airfast Indonesia, an independent company that offers fixed-wing and rotary aircraft services to a variety of customers.

According to the Airfast website, it has provided helicopter services around Timika and Dekai in Papua. The biggest mining operator in Papua is Freeport McMoRan at its Grasberg Minerals District and could be the client for the Mi-171.

As the statement from Russian Helicopters confirms, the Mi-171 (international version of the classic helicopter) can be used for both cargo and passengers.

The Indonesian armed forces operate around 20 Mi-171 helicopters, according to the Russian Helicopters. There are around 700 Mi8/Mi-17 helicopters in the Asia-Pacific region.

According to the statement, "The Indonesian client is currently considering acquisition of an additional batch of Russian-built civil helicopters following the first delivery in October."

■ TRAINING | PARTS

European Nations Consider Parts Pool for NH90

One result of the European Defence Agency's examination in November of the options for member nations to pool and share resources is that several states have shown interest in "cooperating in the testing phase or the pooling of spare parts for the NH90."

According to EDA CEO Claude-France Arnould, this could take the shape of "bilateral, trilateral or regional cooperation" rather than applying to the whole EDA membership. Other pooling and sharing themes included cyber defense capabilities, route clearing CIED and a European Advanced Airlift Tactics Training Course (EAATTC). Arnould said it was important to pool maintenance and logistics support were applicable.

The EDA also planned to hold its third Helicopter Tactics Symposium from November 19-21 in Luxembourg. The EDA organized two helicopter training exercises during 2012 through the framework of the Helicopter Training Program (HTP). There were Hot Blade in Portugal and Green Blade in Belgium (September-October), which was largely focused around the Pegasus special forces exercise which ran alongside. According to the EDA, the exercises involved a total of 56 crews and more than 3,000 ground personnel.

During the Steering Board meeting the EDA reports that defense ministers signed a "program arrangement" for live exercises over the next 10 years.

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■ SERVICES | AVIONICS

SkyTrac Systems Changes Ownership

Kathleen Wallace, founder of Kelowna, BC-based SkyTrac Systems, has sold the company to a group that includes Malachi Nordine, SkyTrac's current director or product development, Stephen Sorocky and Roynat Equity Partners. Nordine will take over as president under the agreement. Sorocky is currently a board member of the Canadian Commercial Corporation. SkyTrac equipment is installed on several helicopter platforms, including AgustaWestland, Bell, Eurocopter and Sikorsky variants. 🚁

■ CORPORATE | AIRFRAMES

Kaan Air Purchases AW169, AW139

AgustaWestland has sold another AW169 and AW139 to corporate/VIP provider Kaan Air. The purchase from the Turkish operator comes two months after an order for two AW169s and one AW139. According to AgustaWestland, there are three AW139s currently flying in Turkey, with a fourth VIP-configured AW139 due for delivery soon. 🚁

■ SERVICES | MAINTENANCE

Barfield Provides Bell 406 Support

Sabena technics subsidiary Barfield has reached a five-year agreement with the U.S. Army's Contracting Command to supply maintenance for the Alkan electro mechanical release units on the Bell 406 fleet. The contact calls for repairs and maintenance involving up to 168 Alkan units, which are used on the XM149 (OH-58D) helicopter armament system. Component maintenance, technical/logistics assistance, engineering support and expendables are included in the agreement. 🚁

■ PRODUCTS | AIRFRAMES

Malaysian Air Force Receives EC725 Duo

Eurocopter has handed over the first pair of EC725s to the Royal Malaysian Air Force as part of an order for a dozen helicopters. The manufacturer plans to deliver the other 10 EC725s through 2014. The helicopters will serve in SAR operations and support utility work throughout the country. 🚁



Malaysian officials taking delivery of the EC725s.

■ MILITARY | PROCUREMENT

Denmark MoD to Buy MH-60Rs to Replace Maritime Lynx Fleet

The decision by the Danish Ministry of Defence to purchase nine MH-60R helicopters from the Sikorsky/Lockheed Martin team has underlined again how strong the belief is in the international naval community in MH-60R/S helicopter. The order is valued at around \$686 million with the first three aircraft expected for delivery during 2016 and last aircraft by 2018. The existing eight Lynx Mk90Bs will begin to be replaced from 2017.

The Danish requirement is one that is mindful of a greater role than just the maritime mission. Although the standard roles of maritime surveillance, search and rescue, and fisheries protection will be carried out from the Karup base—home to Denmark's Tactical Air Command and Army Operational Command—the Navy will also deploy the aircraft on its Thetis class patrol vessels which range into the environmentally challenging seas around Greenland, the Faroe Islands and off the Arctic. Further consideration was its potential contribution to land-based operations, interoperability with other NATO and regional allies, together with logistics, training and future upgrades.

Maj. Gen. Flemming Lentfer of the MoD staff said the selection represented the best choice for the Danish armed forces. The competition included AgustaWestland's AW159 Wildcat and the Eurocopter's AS565 MB Panther, although the latter was eliminated at the beginning of 2012.

The U.S. Navy currently operates around 144 MH-60Rs out of a total requirement of 291, according to Naval Air Systems Command (NAVAIR). In June 2011, the Australian Navy decided to acquire 24 MH-60Rs with handover of the first two aircraft set for 2014. —By Andrew Drwiega, Military Editor 🚁

■ TRAINING | MILITARY

Twentynine Palms Hosts UK 42 Commando's Exercise Black Alligator

More than 600 British Royal Marine commandos are completing an annual six-week exercise, Black Alligator, which is at the U.S. Marine Corps' Air-Ground Combat Center in Twentynine Palms, Calif. The battalion-level exercise has tested the UK 42 Commando's combat skills, part of which included an element dedicated to modern urban combat (MUC) drills. Other aspects saw the use of an RAF Merlin Mk3 helicopter to train for airborne insertion and assaults. The training area is much larger than any available in the UK and the environment more challenging and in-line with potential deployment areas, including Afghanistan. The Royal Marines will take over a Lead Commando Task Group in May 2013. This means they are the first unit to be called by the UK government for any short-notice operation worldwide. 🚁

rotor & wing's Annual Reports



Insight from the 2013 Outlook Panel

It hardly seems possible, yet here we are again at the dawn of another new year. In many ways, it seemed most of us were still waiting for the last one to get going! So as our editors began assembling the collective wisdom of our 2013 Rotorcraft Outlook Panel, I took a moment to look back at the insight we gathered this time last year and you know what? Collectively, I would have to give our panel high marks for accuracy.

Many pointed to offshore operations and the Gulf of Mexico in particular as offering the best opportunity for growth in 2012. While it may not have grown quite as quickly as we would have liked, comparatively speaking, it was and still remains the bright spot on the horizon for many operators and aircraft manufacturers, alike. In fact, the competition for airframes that can more efficiently serve the deep-water market is shaping up to be one of the more interesting heavyweight battles in recent years. The potential financial windfall to the winners and the downside to any company that might get completely shut out could make or break the long-term viability for at least one of the big name helicopter manufacturers.

A number of our 2012 panel members correctly predicted the negative impact of the “uncertain economy” and fiscal austerity measures around the world as the biggest obstacles to industry growth potential in 2012, and of course they were spot-on. Here in the U.S., I think most of us are just happy the presidential election is finally over so there is at least a glimmer of hope that lawmakers might actually do something in 2013. Good, bad or indifferent—some direction is better than no direction. Even if we don't like the results, at least we can set a plan of action to deal with them. So with that said, we bring you the 2013 Rotorcraft Outlook Panel and Annual Reports, where you will have the unique opportunity to steal a glimpse into the vision and strategic plans of how these top industry executives intend to address the challenges and opportunities of the coming year.

Randy Jones
 Publisher, *Rotor & Wing*

As we embark on another new year filled with promise and uncertainty, we decided to ask these questions:

“What technological advancements will most impact helicopter operations in 2013?”

What issue or issues concern you most about the immediate and long-term future of the worldwide rotorcraft industry?”

What is your company doing to improve safety in helicopter operations?”

How has your organization strengthened its training programs?”

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Question 1: What technological advancements do you anticipate will most impact helicopter operations in 2013?

Dave Marone



From the early days of aviation, fuel starvation, unpredictable weather and mechanical failure drive the overwhelming

majority of aviation mishaps. The risk mitigation factors in helicopter operations remain fairly constant; keep the machine mechanically sound, keep fuel in the tanks, and provide a high state of situational awareness for the pilot. As technology continues to evolve, manufacturing quality should continue its positive trend. Today's modern aircraft are manufactured to be incredibly safe, and they are. But in the challenge of maintaining complex equipment, human error is introduced. Training and quality systems can take advantage of some technological advances, but in the end, discipline and attention to detail will remain key drivers for safety.

Fuel and weather management are both matters of situational awareness. Technology has highly automated fuel management, reducing pilot workload and increasing safety. Today's integrated avionics, digital flight bags and autopilot systems provide pilots with real-time situational awareness, nearly eliminating the dangers of orientation in IMC, flight into known terrain, inadvertent flight into embedded thunderstorms, or other weather phenomena that would leave a pilot in a highly compromised position. And, whereas early generation autopilots would quit on you just when needed most, today's systems are worthy of a pilot's trust. Technological advancements have delivered big on safety, and we

look forward to future risk reduction as technology further simplifies and automates the human-machine interface.

Dave Marone
Vice President
Sales and Marketing
BLR Aerospace

Eiji Kawaishi



The pattern we've seen over the past five-plus years will continue: With the continued strong growth of the global

helicopter retrofit market, it's more likely that operations in 2013 will be impacted by currently-available, highly-effective technologies than by new or emerging technologies.

All rotorcraft platforms—Airborne Law Enforcement, Helicopter Emergency Medical Service, Special Mission, Training, etc.—will realize

significant operational improvements by replacing dated and obsolete equipment.

From radio, to audio, to SVS, replacing bulky, heavy components with lighter, integrated, innovative systems with high functional density will result in reduced pilot workload, enhanced flight safety, and reduced operating costs. An example of this is Cobham's Audio-Radio Control and Display Unit (ARCDU), a component capable of controlling all aircraft communications while delivering 40 percent weight savings and 60 percent space savings with a power consumption reduction of 55 percent.

Cobham Aerospace Communications, with some of the most robust and reliable navigation and communication technologies in the aviation industry, continues to offer unmatched capabilities and service to the OEM and retrofit markets.

Eiji Kawaishi
Vice President
Cobham Aerospace

AgustaWestland's AW169 made its first flight in May 2012.



Rotorcraft Outlook Panel

Dmitry Petrov



All helicopter manufacturers look for high-tech solutions to improve their models, and Russian Helicopters is no exception. We are continuing to invest in new technologies to bring maximum benefit to our customers—by making our helicopters safer and more efficient, reducing cost per flight hour, increasing versatility and operational performance in all weather conditions.

In practical terms, this means that we work with leading companies around the world to make their technologies available to buyers of our helicopters, and we also collaborate on R&D, for example to adapt advanced technologies to helicopter construction or develop new technologies from scratch.

One area that we see as particularly promising is the use of composite materials, which are lighter, stronger and more resilient than more traditional inputs, and also reduce manufacturing and operating and servicing costs—essentially a win-win situation for both us and our customers. We already use composite materials to build more than half of the body of the Ka-62, for example, and we expect to make increasing use of these technologies in our helicopters going forward.

Dmitry Petrov
CEO
Russian Helicopters

Lutz Bertling



The continued role of helicopters in society will depend upon our ability to further enhance their safety and effectiveness, while also reducing their environment impact.

From the operational safety point of view, the industry took a

Eurocopter unveiled its EC130T2 variant in February 2012.



positive step a few years ago when the presidents of major helicopter manufacturers – including Eurocopter – signed a letter urging all rotary wing aircraft operators to work towards the International Helicopter Safety Team's (IHST) goal of reducing helicopter accidents worldwide by 80 percent in the next 10 years. After studying the root causes, the IHST found that there are four principal areas of focus to reduce accident rates: safety management systems, training, equipment and scheduled maintenance that adheres to manufacturers' standards.

Our industry must continue developing innovative ideas to improve safety, as illustrated by Eurocopter's first-ever integration of data from the Wide Area Augmentation System (WAAS) air navigation network into an existing helicopter display system. With the incorporation of WAAS data into a helicopter's instrument panel, it becomes possible to land on hospital helipads, oil rigs or sites not equipped with ground navigation aids – even in poor weather conditions.

Reducing the environmental footprint of helicopters also should remain a priority. Even in today's financially challenging times, the manufacturers of rotorcraft must continue their research and technology investments that will lead to lower noise and

reduced fuel consumption. This should include enhancements in aerodynamics – optimized rotor blade configurations and airframe designs are two examples – and the application of active noise reduction systems that benefit from improvements in electronics, sensors and actuators. A full-cycle approach to the environment must be a priority in future generations of helicopters, taking into account a wider view that also includes hazardous materials, recyclability and renewable resources.

Lutz Bertling
President & CEO
Eurocopter Group

Dan Komnenovich



Aircraft performance enhancements and technical advancements by OEMs (original equipment manufacturers) will continue to significantly impact helicopter operations. In the 1960s and 1970s, the major costs of rotorcraft were its airframe and powerplant with a smaller percentage devoted to avionics, instrument panels and weapon systems. Today that trend is

Rotorcraft Outlook Panel



Sikorsky's S-92 assembly line in Coatesville, Pa.

changing with more widespread adoption and use of digital multi-functional instrument panels, advanced communication avionics and navigation systems, and laser-guided weapons. Also, the increased use of turbine engines on lighter helicopter models allows for a large amount of power and a low weight penalty.

These advancements also include increased use of unmanned aircraft in both the military and civil sectors and smaller aircraft that require less fuel and fly longer to improve coverage and reduce cost. The military is now using UAS (unmanned aerial systems) for cargo delivery in Afghanistan to keep the warfighter supplied and eliminate manned ground convoys.

With increased reliability and safety, UAS also are capable of taking on expanding roles—a precursor to the introduction and use of UAS in domestic airspace. The improving technology and mature robotics that enable unmanned aircraft to benefit the warfighter also will enable UAS to benefit commercial operators for such roles as pipeline patrol, search and rescue, surveillance, photography and forestry.

Through its LIFT program that especially serves the helicopter market and rotorcraft OEMs, Aviall is dedicated to enhancing the industry with its many supply chain solutions, including the forecast and on-time delivery of products that feature these technical advances.

Dan Komnenovich
President & CEO
Aviall

Steve Walford



2013 finds the rotorcraft industry on the precipice of change with respect to new technological advancements.

Manufacturers are experimenting with rotor applications, fuel alternatives, composite solutions, and avionics software. These technological advancements will all impact new aircraft as the manufacturers compete to develop and market the most advanced rotorcraft. That being said, the ability of MRO companies to apply some of these new technologies to older fleets may have the most short term impact as operators take advantage of new technological advancements to economically upgrade proven fleets.

Steve Walford
Vice President
of Customer Services
Vector Helicopter Services-
North America

Jim Sensale



The continuing introduction of digital electronics, composites, and elastomers into basic helicopter components and engines that are more reliable, accu-

rate and less susceptible to corrosion, wear, fatigue and vibration than the mechanical systems that have been in place since rotary wing flight began (for example FADEC controls on engines in lieu of mechanical, composite rotor blades and hub components in place of aluminum and steel, elastomeric bearings replacing metal spherical ones).

Jim Sensale
AIS President and Founder

George Ferito



New technology, especially avionics, in the cockpit can be expected to generate additional training challenges

for both the pilot and the training provider.

Transitioning to all-glass cockpits will require targeted training for older, experienced pilots as well as the less-experienced rotorcraft airman. With the generational shift in pilot resources taking place today and in the near term, turbine experience is and will be at a premium. FADEC-equipped rotorcraft will help mitigate some issues such as engine starts, but a turbine skill set can only be developed through experience and/or comprehensive training. Also, more and more EMS and public service operators are engaging in NVG operations. There are now efforts under way to use NVGs during nighttime firefighting.

Specialized, non-type-specific training required to support NVG operations is now available in an AS350 flight training device (FTD) and the FAA will soon qualify additional FlightSafety simulators for NVG training and checking. Also, increasingly sophisticated engines require more frequent and more advanced formal training to keep maintenance technicians current.

George Ferito
Director, Rotorcraft Business
Development
FlightSafety International

Question 2: What issue or issues concern you most about the immediate and long-term future of the rotorcraft industry?

Eric Erickson



The most pressing issue for the rotorcraft industry will continue to be the effects of spending reductions on both the military and commercial side of the business. This will continue to drive manufacturers and operators toward Donaldson's high-performance filtration systems that optimize their return on investment (ROI), while minimizing maintenance requirements. We are seeing more aircraft development programs specifying advanced inlet protection from the inception of their planning stages, thereby protecting vital engine components from the start. Donaldson also continues to be the leading aftermarket supplier of state of the art technology in the particle separator and barrier filter markets.

Eric Erickson
General Manager
Donaldson St. Louis

law enforcement and tours. The industry must partner with government and other stakeholders to reduce risk, improve safety and lower the accident rates.

We at Aviall believe our LIFT program adds value for helicopter operators by reducing costs and improving efficiency with benefits that include more product lines, local stocking of high-demand parts, inventory management, electronic ordering, and the support of Aviall personnel in our 40 customer service centers around the world.

Our industry also must facilitate the introduction of younger people to replace those who are retiring after many years of dedicated service. The amount of knowledge and experience that is leaving our industry today is significant, and we do not now have adequate numbers of people coming into these career fields. We must encourage, train and promote young men and women to replace these pioneers who have served our industry so well.

Dan Komnenovich
President & CEO
Aviall

training practice. There's a reason all of the major energy companies engaged in offshore operations insist upon simulator training for flight crews assigned to fly their employees.

George Ferito
Director, Rotorcraft Business Development
FlightSafety International

Dmitry Petrov



It probably comes as no surprise that, as one of the major global players in helicopter manufacturing, we are generally optimistic about the future of the industry. One issue that we think will be key to the sector's long-term prosperity is collaboration among major players. This is something that will shape the way that global helicopter building looks tomorrow.

As such, collaboration with other leading global companies is something that we pursue as an active part of our strategy. At the 2012 Farnborough International Airshow, for example, we announced an agreement with AgustaWestland to develop a 2.5-tonne class helicopter. This built on earlier agreements with our colleagues at AgustaWestland, including the establishment of a 50:50 joint venture manufacturing plant at Tomilino outside Moscow in 2010.

We also collaborate with component manufacturers to bring advanced technologies to our helicopters. For example, engine technology is an important way to bring down running costs for our customers and improve the flight characteristics of our helicopters.

Dan Komnenovich



Of great concern is the reality that the rising costs of aircraft, spares and fuel are driving behaviors that can impact safety in our industry as operators look for ways to reduce costs and remain in business in today's economic conditions. The International Helicopter Safety Team reports higher accident rates among general aviation, training fleets and smaller operators than for larger commercial missions such as EMS,

George Ferito



Unlike their fixed-wing brethren, many rotorcraft operators continue to conduct pilot training in the aircraft. With helicopter operations, 25 percent of all accidents occur during training. While larger operators are recognizing the safety and much-improved results to be realized by using simulation-based training, many smaller operations are reluctant to step up to the industry's best

Rotorcraft Outlook Panel

Working with manufacturers at the cutting-edge of engine technology ensures that our helicopters meet the highest international standards.

Dmitry Petrov
CEO
Russian Helicopters

Peter Lewis



In one word? Availability and how to avoid increasing difficulties in having OEM equipment serviced. Our

business is providing parts on exchange and keeping consignment inventories equipped worldwide for our customers flying the Eurocopter AS365 Dauphin and EC155 models. If you take a look out how the handful of major OEMs are no longer mass producing items for the Dauphin, it's hardly surprising that our business is increasing as legacy components become scarcer, even if many are still theoretically in

production. We see many parts requiring two years and longer to be manufactured, so that is as bad as obsolescence in the operator's reality when they need to fly.

Working hand in hand with OEMs can be an uphill battle, but we're getting there, some just take longer to understand the concept of product support. Our commitment is to simply be more efficient than the airframe OEM and the equipment suppliers. It takes a lot of forward thinking and planning, but as our company is still expanding healthily, we're clearly filling a niche that needs our presence.

Peter Lewis
CEO
Alpine Air Support

Dave Marone



Over the past 20 years, the increasing cost of aviation fuel has added 30 percent or more to the direct operating cost of most helicopters.

Regulatory burdens and the expense to ensure against litigation combine to further drive cost up. And finally, the available pool of skilled pilots and mechanics continues to drain, adding upward pressure on salaries. Without cost containment, the demand for helicopter services will soften, challenging basic industry economics.

Dave Marone
Vice President
Sales and Marketing
BLR Aerospace

Jim Sensale



The amount of profit generated by operators being squeezed more and more by the ever escalating cost of fuel, insurance, repairs, overhauls replacement parts with little ability to raise their prices and still remain competitive.

Jim Sensale
AIS President and Founder

Question 3: What is your company doing to improve safety in helicopter operations? How has your organization strengthened its training programs?

Lutz Bertling



Safety is the number one priority for Eurocopter. We believe helicopter safety not only involves responding to the requirements of today's operations, but meeting the needs of emerging missions – such as the maintenance of wind energy farms that are being located further and further offshore.

Eurocopter foresees promising possibilities for further enhancements in man-machine interface, which we are incorporating in our new helicopters now being developed; along with the evolution of back-up capabilities – including a supplementary electric motor on single engine rotorcraft to facilitate an autorotation landing in the event of a main engine failure, which we have tested in full-scale conditions.

Another major Eurocopter focus is on expanding the worldwide network of training centers for crews and maintenance personnel through significant investments in

these resources. Here, the emphasis is on full-flight simulators for realism – with some 20 of these systems in operation worldwide, along with the location of training facilities as close as possible to operators' locations.

Safety also extends to maintenance and support, where Eurocopter continues to apply its innovation. This includes our implementation of Radio Frequency Identification (RFID) tags for life-cycle management of helicopter parts, components and systems. In operational use, personnel on the ramp would remotely download data from an RFID equipped helicopter

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Rotorcraft Outlook Panel

after its landing – rapidly accessing information for maintenance, flight times and cycles, as well as in-flight events.

These are just a few examples of our total commitment to safety, which is backed by significant company investments and supported by the dedication of resources from throughout Eurocopter.

Lutz Bertling
President & CEO
Eurocopter Group

George Ferito



FlightSafety is enlarging its helicopter footprint with new simulators and new locations for a growing list of helicopter types. As the helicopter market matures and comes to recognize the value and safety proposition to be realized by subscribing to simulation-based training, FlightSafety will support its rotorcraft customers with new simulators and additional capacity in existing programs. Our new helicopter visual displays use all-glass mirror screens with greatly enhanced fidelity throughout the entire helicopter flight regime. New scenario-based training curriculums and Operational DayFlow classroom programs offer refreshed and even more effective training experiences for the rotorcraft pilot.

George Ferito
Director, Rotorcraft Business
Development
FlightSafety International

Jim Sensale



AIS has a strong commitment to making sure that any and all parts that we sell and or offer for sale are NOT from a source that may affect their safety and ability to perform and or exceed manufacturer and FAA specifications. AIS policy is NOT be part of any transaction that involves any flight critical component or sub component that has been involved in an incident or has incomplete back to birth. All flight critical components and instruments that AIS is and are associated with and or offer for sale are First inspected, repaired or overhauled by a manufacturer and FAA / EASA approved facility and has full traceability back to original manufacture.

Jim Sensale
AIS President and Founder

Dmitry Petrov



Safety is of paramount concern for Russian Helicopters, and we have traditionally maintained extremely high standards in this field. Using proven technologies and tried-and-tested materials is one of the fundamental aspects of our approach. We are, as I have said, always looking to improve our helicopters by making use of advanced new technologies, but we also have to be sure that any new elements that we include have been thoroughly tested to ensure the highest levels of safety.

We also constantly monitor and seek to improve our production technologies, and to ensure that all our workers are well trained and conversant with rigorous standards. This not



Kamov Ka-62 made its debut in 2012.

only guarantees a safer environment in our manufacturing facilities, but also means that our helicopters meet 21st-century quality standards and expectations—such as, for example, being able to operate around the clock in all climactic conditions.

Training is usually included as part of the deal when signing contracts with new customers. We see this as a particularly valuable added-value service for our customers, and are currently building a specialized training center outside Moscow to provide training for customers on all of the models that we produce.

Dmitry Petrov
CEO
Russian Helicopters

Dave Marone



BLR's FastFin Tail Rotor Enhancement and Stability System was designed to improve helicopter safety and operational capability. Recently awarded Aviation Safety Product of the Year by a leading industry publication, BLR is proud to contribute to the safe operation of hundreds of helicopters worldwide. BLR's development projects remain focused on performance innovation and enhanced safety.

Dave Marone
Vice President
Sales and Marketing
BLR Aerospace



Garmin panel on the Bell 525 Relentless.

Eurocopter

20 Years Young, and Going Strong



Celebrating its 20-year anniversary in 2012, Eurocopter marked key achievements by evolving and expanding the company's rotorcraft product line, broadening an already extensive international industrial footprint, and continuing the development of services activities worldwide.

The year's successes underscored Eurocopter's industry leadership since its 1992 creation through a merger of the Aerospatiale and MBB helicopter divisions – later becoming a business unit of EADS.

Among the evolved rotorcraft introduced by Eurocopter in 2012 was the EC130 T2. Retaining the external lines of its popular EC130 lightweight single-engine helicopter, approximately 70 percent of the airframe structure has been modified for the EC130 T2 version.

Features of the EC130 T2 include a more powerful Arriel 2D turboshaft engine and upgraded main gearbox, an active vibration control system and the integration of a crashworthy fuel tank. Inside, the EC130 T2's cabin interior structure is redesigned with a full flat floor, while new energy-absorbing seats improve weight and balance for passen-

ger loading; and increased maintenance accessibility is provided for the electrical and air conditioning systems. Additionally, the helicopter's cockpit is updated for enhanced man-machine interface.

Eurocopter unveiled the EC130 T2 at February's Heli-Expo exhibition in Dallas, Texas, and the initial helicopter was delivered eight months later to U.S. tour operator Maverick Aviation Group – a launch customer for this rotorcraft type.

"Enhancing our product line is an essential element in Eurocopter's strategy to maintain its competitive edge," explained Eurocopter President & CEO Lutz Bertling. "This strategy's success was demonstrated by the EC130 T2's commercial response: at its public unveiling, we already had seven launch customers who booked 105 helicopters."

In 2012, Eurocopter also pursued the flight test and certification program for its EC145 T2 – the medium-size, twin-engine EC145 family's latest evolution, with deliveries to begin in 2013. One of the most visible changes is the incorporation of Eurocopter's Fenestron[®] shrouded fan-in-tail rotor, while the use of FADEC-equipped Arriel 2E engines extend the helicopter's cruise speed to

134 kts. and the operating ceiling to 18,000 feet. The EC145 T2 also further improves on the EC145's comprehensive avionics by adding a four-axis dual digital autopilot as standard, and introducing Eurocopter's new family avionics solution with fully integrated large-screen flight and navigation displays.

Another "evolution" product launch in 2012 was the Super Puma AS332 C1e – a configuration of Eurocopter's 9-ton class, twin-engine helicopter that offers shorter lead times and highly competitive operational and maintenance costs. Launch customer for the AS332 C1e is Starlite Aviation Group – a company that offers a wide range of helicopter services to international clients such as United Nations agencies and NGOs.

The year marked a startup of deliveries for Eurocopter's evolved AS350 B3e version, which is powered by a Turbomeca Arriel 2D turboshaft engine with a new-generation digital FADEC, and an engine data recorder for condition monitoring. The integration of Eurocopter's dual-screen Vehicle and Engine Multifunction Display (VEMD) in the AS350 B3e's cockpit enables pilots to check primary aircraft and engine

parameters in one glance – thus reducing workload and enhancing safety.

New product activity in 2012 included the maiden flight of Eurocopter's first series production EC175 – which is being developed in cooperation with Chinese industrial partner AVIC for deliveries beginning in 2013. The performance figures for this medium twin-engine helicopter have been improved from the original specifications, with a recommended cruise speed of 150 kts. – 10 kts. faster than the previous figure without affecting payload range – while the maximum cruise speed exceeds 165 kts., all at extremely low vibration levels. Eurocopter is applying the newest avionics family – "Helionix" – that meets the latest international avionics standards, and makes the EC175 the second aircraft to apply it, after the Airbus A380.

Eurocopter's development of its next-generation "X" series helicopters advanced in 2012 as well, led by the five-to-six metric ton twin-engine X4. Incorporating breakthrough technologies from Eurocopter and its supplier team, the X4 is to deliver new levels of performance and comfort, along with 20-30 percent lower operating costs per passenger than current-generation rotorcraft, and a reduction in sound levels by as much as 30 to 50 percent. The X4 will come to market in two versions: an initial configuration incorporating the majority of innovation in terms of airframe, engine, systems, rotors and maintainability, with deliveries from 2017; and the final configuration, further enhanced with a newly-designed cockpit, delivered beginning in 2020.

The X³ – Eurocopter's hybrid demonstrator equipped with a pair of turboshaft engines to power both a five-blade main rotor system and two propellers installed on short-span fixed wings – performed a seven-week U.S. demonstration tour in 2012. During its "red, white and blue" American trip, civil and military operators experienced the revolutionary flight characteristics of this high-speed, long-range aircraft as the X³ made appearances in four states from Texas to Virginia.

During 2012, Eurocopter also made important steps in expanding the company's global industrial footprint, which is part of its strategy of being close to the customers and developing a presence in key markets. It inaugurated a new Brazilian rotary-wing center of excellence, where Brazilian Armed Forces EC725

helicopters and civilian EC225 versions will be assembled. Additionally, the Eurocopter Kazakhstan Engineering joint venture is delivering EC145s assembled in Kazakhstan, and Eurocopter signed to create a completion and customization center for the Ecureuil family of light helicopters in Tianjin, China through an in-country joint venture.

Another important element of Eurocopter's leadership strategy is the growth of its international services network through development of company-operated facilities, as well as in cooperative efforts.

For training services, Africa's first full-motion helicopter flight simulator was commissioned by Eurocopter during 2012 at the SimAero training center in South Africa, making a highly capable training device available for pilots and flight engineers operating the Super Puma and similarly-compatible helicopters. In Mexico, a cooperative agreement for the training of helicopter maintenance technicians is now available at the joint training facility opened by Eurocopter de México and Turbome-

ca México – the first of its kind on the American continent to offer Spanish-speaking instructors.

Both training and support services were reinforced at the Singapore-based Eurocopter South East Asia subsidiary in 2012, which becomes the company's Asia-Pacific training center through an expansion that includes the installation of a Dauphin AS365 N3/N3+ full-flight simulator, along the stand-up of Dauphin-family rotorcraft maintenance, repair and overhaul capacity. For Japan, Eurocopter opened a new 150,000-square-foot facility at Kobe Airport for maintenance, repair, overhaul and engineering services capable of handling up to 120 aircraft per year.

An example of Eurocopter's helicopter upgrade capabilities in 2012, was the hand over to the UK Ministry of Defence of the first Puma Mk2 medium battlefield helicopter, which is being improved by the company in a life extension program; while deliveries began during the year of Eurocopter-upgraded CH-53GA transport helicopters to Germany's armed forces.



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Russian Helicopters

Building some of the world's most iconic, innovative and widely operated models.

Russian Helicopters is a leading player in the global helicopter industry, and one of the few firms anywhere in the world with the capability to design, manufacture, test and service advanced models of civilian and military helicopters.

From its headquarters in Moscow, Russian Helicopters manages assets across the country — five assembly plants, two design bureaus, two components manufacturers, an overhaul plant and a service company providing aftersales care to customers around the world. Russian Helicopters companies include some of the most recognizable names in the helicopter world, such as the Mil Moscow Helicopter Plant and the Kamov design bureau.

Russian Helicopters was established in 2007 to consolidate and streamline Russia's many world-famous helicopter enterprises, some with long and distinguished histories dating back more than 60 years. The enormous depth of knowledge and expertise accumulated through these enterprises' years of experience is one of the greatest assets of Russian Helicopters today.

Russian Helicopters is part of UIC Oboronprom, a diversified industrial and investment group that manages assets in the high-tech and engineering sectors. Oboronprom in turn is part of Russian Technologies State Corporation, which supports Russian



industry in the development, production and export of high-tech industrial products for civil and military use.

Advanced Technologies

Russian Helicopters produces an extensive range of civil and military helicopters for a diversified international client base. The company puts its customers' requirements at the heart of its operations, and focuses on creating a product that keeps operating costs low while adhering to the highest standards of safety and reliability. This focus on delivering exceptional value for money has brought clear benefits, with Russian Helicopters' book of firm orders growing significantly despite the troubled economic

climate, to reach 921 units — a total value of more than 460 billion rubles (about U.S.\$15 billion) — as of the end of 1H 2012. That's more than three times the number of helicopters the company delivered in 2011.

The company also seeks to increase the reliability and economic efficiency of its helicopters by investing in the latest advanced materials and components, often in collaboration with leading companies around the world. Polymeric composite materials are one area that Russian Helicopters views as particularly promising, and they already comprise more than 50 percent of the airframe and propellers of the Ka-62.

The Ka-62 — a single-rotor design with an enclosed tail rotor — is an excellent example of the benefits of Russian Helicopters' collaborative approach, as it can be fitted with two Turbomeca Ardiden 3G engines, which deliver exceptionally low fuel consumption, and a glass cockpit made by Transas, the global manufacturer of advanced navigation systems. This model also epitomizes Russian Helicopters' dedication to making its helicopters as resilient and adaptable as possible: like most of the company's models, it can operate in a variety of climatic conditions and withstand a wide range of temperatures. The Ka-62 can fly numerous different mission types, from cargo transportation to medevac and search-and-rescue operations, and





Graphic rendering of an Mi-171A2.

is also suitable for use in the oil and gas sector and for corporate purposes.

Global Footprint

In addition to dominating in its home country and CIS markets, Russian Helicopters also sees high demand for its helicopters from fast-growing markets in South and Central America, the Middle East, Africa and the Asia-Pacific region. Helicopters are popular not only among traditional customers such as emergency and rescue services, but also with companies for corporate transportation purposes. Because of their versatility and high adaptability to different challenges, helicopters are equally valuable to an oil and gas company taking workers to an offshore platform and to busy executives looking to cut down their transit time in and around traffic-choked cities. Russian Helicopters continued to concentrate on these key high-growth

markets in 2012. In Latin America, the company has established a footprint in Argentina — two Mi-171s were delivered to that country's air force, and will mostly fly missions to support exploration in the Antarctic, as well as search-and-rescue operations — and Brazil, where the first multirole coaxial Ka-32A11BC was delivered to an operating company in March. The Ka-32A11BC is also one of the only models on the market that can be used in to tackle fires in high-rise buildings — a situation in which conventional fire-fighting methods are rendered ineffective — and is therefore particularly suited to urban environments. It has also been in demand closer to home, with two being delivered to the Kazakhstan Emergencies Ministry.

In Asia-Pacific, Russian Helicopters continued to maintain strong relationships with Chinese customers, signing a contract to deliver 52 Mi-171E

transports between 2012 and 2014. The contract built on the success of a previous deal signed in 2009 for 32 of the helicopters. Another first during the year was the delivery of a medium multirole Mi-171 to Indonesia.

Once again, Russian Helicopters' focus on versatility and reliability — the Mi-171 can operate in a wide variety of climactic conditions — proved decisive in the choice of an advanced Russian Helicopter for use in Indonesia.

Full-Service Offering

Another key aspect of the Russian Helicopters offering is the complete support provided to customers both during and after the order process. Russian Helicopters is rolling out a global maintenance and repair network through its Helicopter Service Company. Regional hubs are being established around the globe to service customers on a regional level, including the key fast growing markets of India and China. In September 2012, Russian Helicopters and Denel Aviation of South Africa announced plans to open a new regional service hub for the sub-Saharan region in 2013.

Russian Helicopters has also established a dedicated training academy at its new base in the Moscow region town of Tomilino. The academy will provide training for both flight crews and technical support staff on all aspects of operating and maintaining the helicopters built by the company.



Kamov Ka-62.

FlightSafety

Simulation-Based Helicopter Training Delivers Superior Results

FlightSafety International, the world's foremost aviation training company, provides groundbreaking simulation-based helicopter training and customer care with quality, range, service and value. The company pioneered both Level D simulation and Level 7 flight training devices for helicopters and continually responds to changing industry demands.

Forefront of Technology

FlightSafety also was the first to offer electric motion and control loading for the most precise and realistic simulator experience possible. The company's VITAL visual systems deliver the most precise and realistic training experience available, with unmatched fidelity, extensive visual databases and a broad range of environmental conditions including brownout and whiteout. Coupled with its exclusive all-glass mirror displays, FlightSafety simulator visuals have no peer.

In the Lead on NVG

FlightSafety's Tucson, Ariz.-based Level 7 Eurocopter AS350 FTD – the first simulator of any type qualified for night vision goggle training – offers in-depth NVG scenarios far superior in scope and realism to anything that could be attempted in a helicopter. The company expects to soon earn NVG qualification for its DFW-based Eurocopter EC135 Level D simulator and plans to incorporate NVG capabilities in all new helicopter simulators moving forward.

A Broad Range of Options

FlightSafety training spans the range from advanced fixed-base FTDs to the most sophisticated Level D simulators for aircraft such as the Sikorsky S-92. FlightSafety fielded the world's first Level 7 helicopter FTD and now operates these devices for the Bell 206, Bell 407 and Eurocopter AS350. These advanced FTDs incorporate the latest visual realism and other components from full flight simulation while allowing the economy of fixed-base training.

Global Training Network

FlightSafety continually expands its helicopter training footprint with additional makes and models and new training locations. In early 2013, the company will bring a simulator online in Lafayette, Louisiana, to initiate factory-authorized training for the AgustaWestland AW139. Also in 2013, the company plans to open a new Learning Center in Stavanger, Norway, to offer Sikorsky S-92 training; transition its Fort Worth Bell training to DFW; and will bring two more Eurocopter EC135 simulators online – one at London Farnborough and a second simulator at DFW.

FlightSafety training programs:

- DFW Learning Center: Level D pilot training for Eurocopter EC135; pilot training for Bell 212, Bell 412* and Bell 430*
- Lafayette Learning Center: Level 7 FTD pilot training for Bell 206/TH-67 and Bell 407; Level D pilot training for Sikorsky S-76C and S-92; Level D pilot training for AgustaWestland AW139*
- London Farnborough Training Center: Level D pilot training for Eurocopter EC135*
- Stavanger, Norway: Level D pilot training for Sikorsky S-92*
- Tucson Learning Center: Level 7 FTD pilot training for Eurocopter AS350
- West Palm Beach Learning Center: Full flight simulator pilot and maintenance training for Sikorsky S-70, S-76B/C, S-76D* and S-92

*Training available 2013.

P&WC Engine Training

Through an exclusive agreement with Pratt & Whitney Canada, FlightSafety offers factory-authorized maintenance training on the full range of P&WC engines at Learning Centers and training locations worldwide.

Mission-Specific Scenarios

FlightSafety's mission-oriented approach provides a major advantage in helicopter training. EMS pilots train to convincing scenarios drawn from real-life challenges. Offshore crews face training scenarios that replicate their



particular situation. The company also offers mission-specific training for law enforcement and newsgathering. For a growing number of aircraft, training follows FlightSafety's breakthrough Operational DayFlow regimen, which presents training scenarios within the context of a typical flight day.

Programs can be customized to emphasize scenarios specific to any operation. A full complement of specialty training courses meet helicopter pilots' specific training requirements, including Air Medical Resource Management.

- Inadvertent IMC procedures
- Night and NVG operations
- Instrument procedures
- EMS flight operations
- Law enforcement flight operations
- Crew resource management
- Approach and landing accident reduction
- Aviation decision-making

The Training Leader

FlightSafety offers factory-authorized training for Bell, Sikorsky and AgustaWestland. It is the world's premier professional aviation training company and supplier of flight simulators, visual systems and displays to commercial, government and military organizations. The company provides more than a million hours of training each year to pilots, technicians and other aviation professionals from 154 countries. FlightSafety operates the world's largest fleet of advanced full flight simulators at Learning Centers and training locations in the United States, Canada, Europe, South Africa and Asia.

FLIGHT SAFETY

Customer Care

Quality Range Service Value

Our Customers are at the center of everything we do. We listen to their needs and respond in ways that not only meet, but exceed expectations. Over the years, that's led to a relationship that's, well, more like family.

Take Advantage of Our New Customer Care Program

The new Customer Care program* exemplifies our commitment to provide outstanding customer service. It includes ongoing access to FlightSafety's industry-leading Proficiency Protection program, designed to help our Customers maintain their skills even when they're between jobs.

Jet Professionals, the well-respected industry leader in staffing services, provides our Customers with preferred access to job placement support. They can also benefit from interactive online customer service and job interview skills training offered by ServiceElements. In addition, FlightSafety ProCard recipients receive a life insurance policy at no cost.

*Conditions apply. Please see our website for details.

Book Your Own Training With Online Convenience

FlightSafety is introducing a revolutionary new service early next year that will enable our Customers to schedule their training online, confirm their simulator times, manage their training agreements, and enable most to get their training records immediately upon completion of training.

Fly the Way You Train; Train the Way You Fly

Our new, innovative, highly customized Operational DayFlow training methodology transforms ground school training by presenting critical procedures and tasks according to phase of flight. Available for 19 aircraft programs this year and more to come in the future.

Benefit From Our Investments In Your Training

Our ongoing investment gives our Customers the widest and most complete range of training services, equipment and locations available. We have, or soon will add, 28 new training programs that offer full flight simulators for current and next generation fixed-wing aircraft and helicopters at locations worldwide.



New Programs in 2012

Bombardier Challenger 605
London Farnborough, UK

Dassault Falcon 900LX
Dallas, TX

Dassault Falcon 7X
Dallas, TX; Paris, FR

Embraer Legacy 600
Houston, TX; St. Louis, MO; Paris, FR

Embraer Legacy 650
St. Louis, MO

Embraer Lineage 1000
St. Louis, MO; Paris, FR

Eurocopter EC135
Dallas, TX

Gulfstream G280
Dallas, TX

Gulfstream G450/G550
Dallas, TX; Hong Kong

Gulfstream G650
Savannah, GA

Coming in 2013

AgustaWestland AW139
Lafayette, LA

Bombardier Global 5000/6000
Columbus, OH

Cessna Citation M2
Wichita, KS

Cessna New Citation X
Wichita, KS

Embraer Legacy 500
St. Louis, MO

Eurocopter EC135
London Farnborough, UK

Gulfstream G650
Third simulator, location TBD

HondaJet
Greensboro, NC

Pilatus PC-12 NG
Dallas, TX

Sikorsky S-70i
West Palm Beach, FL

Sikorsky S-76D
West Palm Beach, FL

Sikorsky S-92
Stavanger, Norway

For information, contact Scott Fera, Senior Vice President, Marketing • 718.565.4774
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FlightSafety
international

Donaldson Aerospace & Defense

Countering Nature's attacks on helicopter engines

Donaldson Aerospace and Defense's inlet filtration systems are helping a growing number of civil and military operators worldwide to protect helicopter engines from damage and improve their maintenance costs and reliability even under the harshest of conditions.



Dust, sand and debris can attack helicopter turbine engines, hampering their performance and decreasing overhaul intervals. Donaldson's widely used Inlet Barrier Filter (IBF) systems and the Universal Filter Module it introduced in 2012 for heavy, twin-engine helicopters counter such attacks, providing operators with high performance and demonstrated returns on investment through sustained engine efficiency and extended times between overhauls. Donaldson last year delivered a complete Engine Air Particle Separation System (EAPPS) for one of the world's newest and most innovative helicopters: the three-engine, heavy-lift CH-53K that Sikorsky Aircraft is developing for the U.S. Marine Corps.



With the U.S. military alone, Donaldson IBFs have saved millions of dollars in maintenance, repair and overhaul during more than a decade of combat in Afghanistan and in Iraq. They are standard on U.S. Army Special Operations Boeing MH/AH-6 Little Birds and Bell OH-58D/F Kiowa Warriors, and support 25 percent of the Sikorsky UH-60 Black Hawk fleet.

Expanding Protection

New IBF systems have extended the range of aircraft whose performance is protected by Donaldson, a division of the Donaldson Company (NYSE: DCI). These include the first-ever barrier filters for the AgustaWestland AW109E/S/SP, Bell Helicopter 407GX and 206LR and Eurocopter AS350B3e. Last year, Donaldson saw new IBF applications enter service in the U.S., Europe and Africa and won new approvals for IBF use from regulators in Brazil and Japan on AW109-series aircraft.

The U.S. homeland security agency Customs and Border Protection has selected Donaldson's IBF for all of its new AS350 light enforcement

helicopters. In the Middle East, the United Arab Emirates Presidential Guard chose the IBF to protect its nine-aircraft AW139 fleet.

"Civil and military helicopter operators have relied for decades on Donaldson Aerospace and Defense for high-performance filtration systems and operational reliability," said Eric Erickson, general manager of Donaldson Aerospace and Defense in St. Louis, Mo. "In 2013, we are committed to further satisfying those customers and to developing new technologies to meet the requirements of emerging helicopter designs like the CH-53K of increased speed and size."



A review of 2012 shows the list of Donaldson filtration systems applications and customers is growing.



New Applications in 2012

In the U.S., Caldwell, Idaho-based Summit Air Ambulance began flying the first AW109Es equipped with an IBF, which it provided key assistance in developing. Summit flies “in extremely dusty environments,” said Senior Vice President Larry Bacus, and the IBF “will cut our non-scheduled maintenance and our engine overhaul costs drastically and enhance our safety program.”

The world’s first IBF-equipped AW109SP is being operated by Salt Lake City, Utah-based Intermountain Healthcare’s Life Flight, whose missions include flights to high-altitude landing zones in Utah’s Wasatch Mountain Range and dusty, hot ones like St. George in southern Utah.

Life Flight Network, headquartered in Aurora, Oregon, chose the Donaldson IBF for its growing fleet of AgustaWestland A119Ke aircraft. That air medical operator, which serves areas of Oregon, Washington and Idaho, ordered 15 A119Ks at Heli-Expo last year.

The air medical operator Air St. Luke’s, based in Boise, Idaho, is serv-

ing mountainous central Idaho with new Bell 429s equipped with IBF systems.

One of the first Eurocopter AS350B3e aircraft in Europe, flown by Scandair Helicopter of Hudiksvall, Sweden, is protected by Donaldson’s IBF. Scandair has flown well over 200 hours with the IBF system on missions that include aerial application in very dusty environments, and owner Fredrik Ulander said his team is “very, very pleased.”



In Africa, the AS350B3e IBF entered service with the Kenya Police Air-Wing’s new aircraft.

Saudi Aramco has ordered IBFs for installation on its entire AW139 fleet, which flies in some of the most extreme operating conditions seen in Middle East aviation operations.

Leading Industry Role

Donaldson plays a leading role in the rotorcraft industry. At Heli-Expo 2012 in Dallas, it conducted its second annual information session, briefing operators on “Engine Protection – Realizing Return on Investment (ROI) Quickly.” That session focused on the latest rotary-wing filtration technology developments and methods to maximize value for system investments.

Donaldson’s 12,500 employees support customers at more than 100 sales, manufacturing, and distribution locations around the world.

For more information, contact: Donaldson Aerospace and Defense, Sales and Marketing, 636-300-5200, afssales@donaldson.com, www.donaldsonrotorcraft.com.

Lease Corporation International

Leasing: the New Direction for Helicopters

In the fixed-wing market, leasing aircraft is an established model. For over 30 years, airlines have chosen to lease a portion of their fleet from reputable lessors. This has proven benefits over outright purchase as operating leases provide valuable flexibility for operators and help maintain low debt-to-equity ratios.

International lessor Lease Corporation International has been a fixed-wing lessor for years and has now set up a specific helicopter leasing division with a brand new fleet of AgustaWestland aircraft. The common family of models (AW139, AW169, AW189) shares the same flight characteristics, safety features, and cockpit layout. It also offers the same design philoso-

phy and maintenance concept whilst catering for a variety of helicopter needs from 4 to 8.5 tons. It is particularly ideal in terms of approach for the offshore oil & gas, search and rescue (SAR) and aero-medical transport sectors.

Advantages of the operating lease arrangement include no down payment, no residual risk and no loan balloon payments. Loan payments are replaced with fixed monthly rentals and operators can save their financing capacity for other lower risk uses. At the end of the lease, the lessor has full residual value risk and the lessee simply returns the helicopter. Importantly, this gives access to the latest technology with great flexibility. Short

or long-term leases can be arranged according to individual needs with rates set according to equipment and duration of contract.

Explaining the rationale for the new service in rotary wing leasing, LCI comments:

“There is currently a high level of unfulfilled demand for new generation helicopters. With us, all lessees have a flexible operating lease solution and immediate access to the innovative, market-leading AgustaWestland aircraft.”

With new models available and greater need for rotary wing aircraft throughout the world, it certainly seems leasing is about to take off in the helicopter sector.

Why lease?

- No capital expenditure
- Capacity management
- No residual value risk

Why LCI?

- Proven leasing pedigree
- Brand new fleet, flexible terms
- Global presence, \$1.5bn portfolio

Why AgustaWestland?

- Safety, reliability and proven track record
- Family concept - AW139, AW169 and AW189
- Common design philosophy minimising costs

Why wait?

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New AW139s for immediate lease

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Market acceptance of the FastFin[®] Tail Rotor Enhancement and Stability System from the OEM, civil, and military operators worldwide continues to drive strong growth for BLR Aerospace. Now certified worldwide for most Bell medium platforms, there are nearly 500 FastFin installations worldwide, flying diverse missions.

Diverse Missions

Operators are flying with FastFin for missions that include firefighting, EMS, airborne law, offshore oil, heli-skiing, rescue, paramilitary, and VIP transport, among others. Bell Helicopter installs FastFin as standard equipment on all new Bell 412EPs.

Wise Investment

The FastFin System modifies the tail boom with two parallel stall strips, known as Dual Tail Boom Strakes, and a reshaped vertical fin, optimizing air-flow around the tail boom for dramatic improvements in tail rotor efficiency and wind azimuth tolerance. With these simple changes, operators can — and do — earn more than ever before. The system is capable of delivering measurable and rapid return on investment, as well as continual savings throughout the life of the aircraft. Wherever and however you fly, BLR can quickly and easily calculate how the System will benefit your operations.

Big Improvements

With the FastFin System, most Bell 412 operators can increase their useful load between 10 and 15 percent and greatly improve their cross-wind capabilities. Bell 212s equipped with FastFin can realize useful load increases up to 91 percent. In addition to performance improvements, FastFin's significant increase in stability enhances safety.

About BLR Aerospace

BLR Aerospace develops high-performance aerodynamic solutions for fixed- and rotary-wing aircraft, and backs its superior designs with unsurpassed manufacturing quality. Products include FastFin, Dual Tailboom Strakes, Winglets and vortex generators for customers that include industry-leading OEMs and operators worldwide.

Dave Marone

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Putting a FastFin[®] System on your existing Bell 412 enables you to haul up to an additional **1,250 pounds** at altitude. That's nearly **double** what a non-modified aircraft can carry.

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Vector Aerospace Helico

Setting the Standard of Customer Service

Vector's ongoing effort to improve performance and longevity of engines, structures and associated accessories has been the key to differentiating it from other maintenance, repair and overhaul shops. Through facilities across North America, Vector's Helicopter Services Division provides services to commercial and military customers for various types of gas turbine engines, components and helicopter airframes.



Helicopter Support

A subsidiary of Vector Aerospace Corporation, Vector Helicopter Services North America has been supporting a variety of helicopter types and models including engines, airframes, avionics and associated components since the early 1960's. An industry-recognized leader in modification and repair, Vector has established a reputation that is unsurpassed in the helicopter industry. Vector provides customers with unparalleled service performing repairs, modifications and upgrades to an exceptional level of safety,

reliability, durability and performance in the most efficient and cost-effective manner.

Vector's Broad Capabilities and Support

Vector's Canadian facilities are Transport Canada (TC) Approved Maintenance Organizations, and its US facilities are Federal Aviation Administration (FAA) Approved Repair Stations. Vector maintains the following OEM certifications:

- Eurocopter - Approved Technical Center for the AS350, AS355 and EC130 helicopter airframes, components and accessories, and AS332 airframes;
- Sikorsky - S76 Repair and Overhaul Center and Customer Service Center. Technical Arrangement to support S61, H-3 and Sea King airframes and components;
- Rolls-Royce - Approved Maintenance Repair & Overhaul Center (AMROC) for all M250 Series engines;

- Pratt & Whitney Canada - Distributor and Designated Overhaul Facility for the PT6T engines;
- General Electric - Authorized Overhaul Facility for the CT58/T58, T700/CT7 engines;
- Turbomeca - Authorized Overhaul Center for the Arriel 1 series engines in North and South America, and the Arriel 2 series engines in North America;
- Transport Canada - Design Approval Organization # 05-V-02; and
- ISO 9000-2008 - All Vector facilities are registered to the ISO 9000 standard.

Structures

Vector provides structural repair, maintenance and airframe modifications. Vector offers a number of FAA approved Supplemental Type Certificates (STCs) to upgrade "Huey" and Sikorsky airframes; with the first Vector-modified Huey flying in 1992.



Some of Vector's Helicopter MRO Capabilities

Engine Testing	Avionics Support	Eurocopter Component Shop
Accessory Support	Airframe Rewire	Bell Component Shop
Aircraft Maintenance Support	Wire Harnesses	Component Repair
Airframe Structural Support	Sikorsky Dynamic Component Support (Including Testing)	Engineering Support

pter Services

Vector performs complete airframe related inspections, modifications, overhaul and repair up to and including full helicopter rebuilds; including those resulting from accident or incident. Vector personnel not only support helicopters within its facilities, but also travel to customer locations anywhere in the world to provide support at the customer operating facilities.

Specialized Avionics

Vector's avionics department consists of a team of highly trained

specialized technicians who use the latest technology and are world renowned for quality rewires, new installations, refits and avionics upgrade capabilities. Included in their many achievements is the design and installation of a variety of integrated cockpit display systems for Bell 212/206/205A1 and Sikorsky S61.

The Experience to Make a Difference

With more than 60 years experience and with professionally trained technicians who are equipped

with the necessary manufacturer's specialty tooling and equipment, Vector has gained an exceptional reputation among both commercial and military customers for providing value-oriented MRO services and solutions.

Vector recognizes that all customers have a mission specific requirement that is unique to the way they operate. And Vector in turn satisfies those unique needs – giving them an advantage over their competitors.



Photo Credit: Eurocopter

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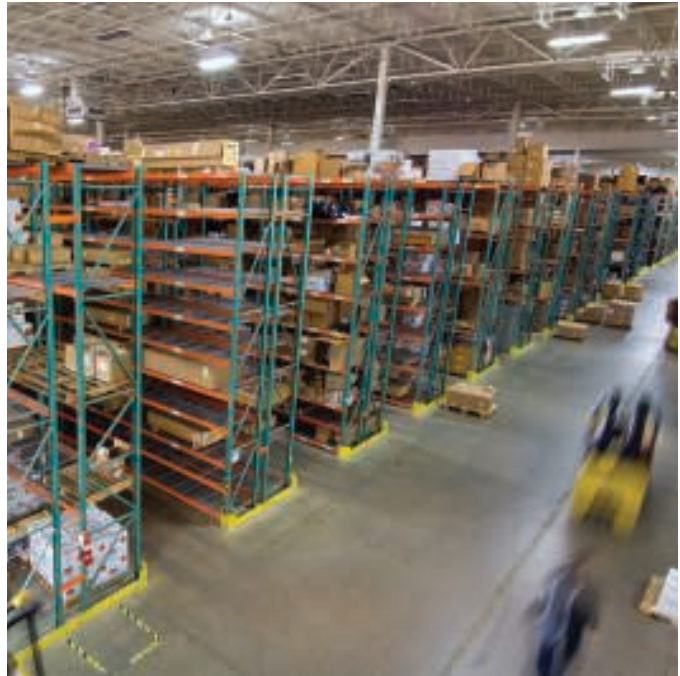
LIFT Helps Helicopter Customers Hover Higher

Aviall's LIFT program offers a variety of services tailor-made for each helicopter operator. All services are designed to add value and reduce costs for customers. The benefits include access to more than 240 product lines, local stocking of high-demand parts, inventory management, electronic ordering via the aviall.com website or EDI (electronic data interface), and the support of local Aviall sales personnel.

To provide the highest quality service, Aviall looks at the unique needs of each customer and develops a plan specifically for them. By managing and combining supply chain and administrative and inventory functions for a customer, Aviall performs a valuable service that would normally cost customers time and money.

The LIFT program was created exclusively to serve the helicopter market. Aviall recently expanded its general helicopter inventory to support the program. In addition, Aviall offers exchange programs for Rolls-Royce M250[®] engine parts and starter generators, as well as Lord Corporation's isolator exchange program for the Bell 206 and 407 applications. Aviall's exchange program is designed to improve reliability and performance while lowering operating costs for customers.

Because Aviall is the world's largest diversified provider of new aviation parts—with more than 2,000,000 unique aircraft and engine parts—it is able to leverage its sizable supply chain efficiencies to provide solutions other companies can't. It is a one-



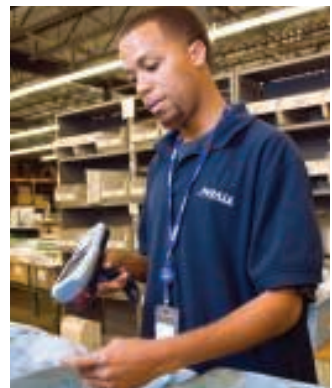
stop shop for customers. Aviall prides itself on pairing outstanding customer service with technical innovation, advanced distribution capabilities, and an unmatched number of parts and services that includes battery, hose, wheel and brakes, kitting and paint mixing needs.

Aviall's central distribution facility in Dallas is ISO 9001, AS9100, AS9120 and AC 00-56A-registered. It is the hub for multiple Aviall Customer Service Centers and stocking locations in Canada, the United Kingdom, the Netherlands,

Dubai, Singapore, Hong Kong, Australia, New Zealand and the United States. These locations also provide the industry's most experienced and responsive field representatives, backed by an inside support team dedicated to customer satisfaction.

Aviall—with roots dating back to 1932—operates as a subsidiary of The Boeing Company.

For more information about Aviall or Aviall LIFT, please call 1-800-AVIALL-1 for North American Sales or 1-800-AVIALL-3 for International Sales.



300



300 is the number of customer service professionals deployed around the world who can help helicopter operators and maintenance providers save money with Aviall's LIFT program. Aviall works hard to provide you with exactly what you need, precisely when you need it. **Aviall Delivers.**



aviall.com

North America Sales and AOG: 1-800-AVIALL-1
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AVIALL
A BOEING COMPANY

Aviation Instrument Services

Putting Customers First with a Commitment to Excellence

The employees at Aviation Instrument Services, Inc. (AIS) strive each day to meet the principals president Jim Sensale founded the company on over 35 years ago—to build a reputation of excellence through outstanding customer service and support. Whether looking for an altimeter or main gearbox, you can depend on the attentive sales staff to quickly provide any part at an exceptional price.

AIS offers extensive sales experience, high quality parts, expert repair management, reliable consignment services and exceptional support. Since 1977, the highly trained sales associates have worked to meet a variety of customer needs. With most of the sales department having more than 20 years of experience working in the aviation industry, additional staff has carefully been selected to help the company develop and grow on the envisioned path of excellence. Despite the current challenging economic environment, AIS remains strong and plans to add more local and remote

sales associates for future expansion. Coupling experience with strong customer and vendor relationships, AIS has expanded its extensive in-house inventory by offering consignment services to operators and suppliers as a solution for handling excess inventory. AIS currently manages consignment for well-respected companies such as Petroleum Helicopters (PHI), Air Methods Corp., Lider Air Taxi, and others. This service allows consignors to retain ownership of surplus equipment while letting a proven team handle the warehousing, marketing, sales and support of inventory to produce additional revenue.

Over time, AIS has broadened its knowledge of instruments and avionics into more diverse systems including engines, transmissions and gearboxes, as well as components such as blades, hydraulic actuators, landing gear, rotor hubs, and many others. Whether consignment inventory or company owned, AIS uses industry experience and long-term relationships with the top repair

facilities to anticipate customer needs and maintain a diverse selection of airworthy equipment for outright and exchange sale. This is particularly beneficial for consignors enabling them to market and sell surplus inventory in better condition than previously held, thus increasing revenue to assist in their operations. At the same time, the expansive inventory benefits customers looking for new or replacement items that are ready to be installed on their aircraft, including any model Sikorsky, Bell, Eurocopter and others.

Today, AIS has developed into a multi-dimensional company that can assist customers as a single source provider for the vast majority of instrumentation and component needs in fixed and rotor wing aircraft. AIS strives to assist its clients in finding quality and cost-effective solutions for parts and services every step of the way. Commitment to excellence has always been the cornerstone of AIS. Now and in the future, AIS plans to meet and exceed your expectations.

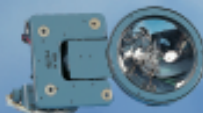
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It is our clear aim to be the market leader in AS365 and EC155 helicopter aftermarket parts support. We have made major and continual investments in Dauphin spares. We specifically stock every single Sagem AP-155 autopilot component and have an extensive inventory of avionics and instruments on the shelf, ready to ship. Main and tail rotor servos, engine accessories, starter generators and landing lights to name just a few.

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As a factory authorized distributor for Messier, Sagem Défense et Sécurité and Thales AES in France, Alpine has established marketing agreements to

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Alpine Air Support's Quality System is ASA-100 accredited and approved (based on FAA AC-00-56A). We have a worldwide Dauphin operator and service center customer base who trust our quality, appreciate our service and competitive pricing. If you fly or maintain Dauphins, we should be talking!

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Helicopter Training and Simulation Global Leadership

CAE has an unparalleled breadth of experience in helicopter simulation, training and mission rehearsal. In fact, no other company has designed training systems for a greater variety of rotary wing platforms. CAE has simulated helicopters from virtually all the major manufacturers, including AgustaWestland, Bell Helicopter Textron, Boeing, Eurocopter, Hindustan Aeronautics Limited (HAL), Kaman, MD Helicopters, NHIndustries, and Sikorsky. CAE is also the industry pioneer in designing and developing a comprehensive turn-key training service for helicopter training, as evidenced at CAE's Medium Support Helicopter Aircrew Training Facility (MSHATF) in the UK.

Military Highlights

CAE is responsible for the design and development of some of the most sophisticated and capable helicopter training systems in the world. For the U.S. Navy MH-60S "Sierra" and MH-60R "Romeo," CAE is providing tactical operational flight trainers (TOFTs), which include both the operational flight trainer to train pilots and co-pilots as well as weapons tactics trainers (WTTs) to replicate the back-end of the helicopter for training sensor operators. When integrated, MH-60 TOFTs provide a comprehensive solution to train flight and tactical skills together.

Recently, CAE was awarded a contract from the U.S. Navy to develop two MH-60R TOFTs for the Royal Australian Navy (RAN) under a foreign military sales (FMS) program. This is the first-ever procurement of the U.S. Navy's most advanced anti-submarine and anti-surface warfare helicopter outside the United States. The two MH-60R TOFTs for the RAN will be delivered in 2015 to HMAS Albatross, located near Nowra in New South Wales and home of the Royal Australian Navy's Fleet Air Arm.

CAE and HAL established a joint venture company in Bangalore, India called the Helicopter Academy to Train by Simulation of Flying (HATSOFF). The HATSOFF training center includes a CAE-built full-mission helicopter simulator that features CAE's

revolutionary roll-on/roll-off cockpit design, which enables cockpits representing various helicopter types to be used in the simulator. The HATSOFF training center currently offers training on three helicopter types – the Bell 412, the civil/conventional HAL Dhruv, and the Eurocopter AS365 N3 Dauphin. An additional cockpit for the Indian Army/Air Force variant of the HAL-built Dhruv will be added in 2014.

The CAE Brunei Multi-Purpose Training Centre (CAE Brunei MPTC) is a joint venture of CAE and the Government of Brunei established in 2012. Initially, the CAE Brunei MPTC, which is scheduled to open in 2014, will include the development of the region's largest helicopter training center with training programs already under development for the Sikorsky S-92 and S-70i Black Hawk helicopters.

CAE and AgustaWestland have a joint venture company called RotorSim that offers comprehensive AW109 and AW139 at several locations globally, and will add AW189 training at the RotorSim training centre in Sesto Calende during 2013. CAE is also developing, in partnership with AgustaWestland, AW139 full-flight simulators for Professional Way in Malaysia as well as a joint venture of Abu Dhabi Aviation and Mubadala Aerospace in the Middle East.

Civil Highlights

CAE is significantly expanding its global presence in civil helicopter training. CAE and its partners offer training on 17 helicopter simulation in 11 locations, including Bengaluru, India (HATSOFF); Dubai (Emirates-CAE Flight Training); Sesto Calende, Italy (RotorSim); Stavanger, Norway; Aberdeen, Scotland; Morristown, N.J. and Phoenix, Ariz.; Vancouver, Canada; Toluca, Mexico; Sao Paulo, Brazil; and Zhuhai, China.

These locations include simulators for the AgustaWestland AW109 and AW139, Bell 212/412, Eurocopter AS332L/L1 Super Puma, AS332L2 Super Puma, AS350B2 Astar, AS365 Dauphin, HAL Dhruv, and Sikorsky S61, S-76B, S-76C+ and S-76C++. In 2011, CAE acquired the helicopter

flight training operations of CHC Helicopter, a global leader in helicopter services, and agreed to become CHC's long-term training provider, responsible for training more than 2,000 helicopter pilots and maintenance engineers.

CAE also formed a joint venture with Lider Aviacao, the largest helicopter operator in Brazil. The new JV acquired the first full-motion Level D CAE 3000 Series full-flight simulator (FFS), replicating the S-76C++ installed at CAE's training center in Sao Paulo.

CAE and JV partner China Southern Airlines also installed an S-76C++ FFS in Zhuhai, the first CAE 3000 Series civil helicopter flight and mission simulator in Asia.

In early 2012, CAE opened a new training center near Mexico City in Toluca, including a Bell 412 FFS. The CAE 3000 Series helicopter flight and mission simulators provide an immersive training experience for civil helicopter pilots. This new CAE simulation capability offers unprecedented realism for helicopter-specific mission training, including offshore, emergency medical services, law enforcement, high-altitude, corporate, and other operations.

The U.S. FAA qualified the first CAE 3000 Series helicopter simulator, a Eurocopter AS350 located in Phoenix, for Level 7 flight training device credits. FAA has also approved CAE to deliver the pilot training ground school for the AS350 helicopter through a CAE Simfinity e-Learning program, enabling pilots to reduce their time at the training center for both initial and recurrent training.

CAE: Uniquely Qualified

CAE is uniquely qualified to handle all helicopter simulation, training and mission rehearsal needs. From entry level training devices to the networking of advanced multi-mission helicopter simulators operating in an interactive threat environment, we've earned our reputation as the leader in helicopter simulation. CAE's experience, technology leadership, and focus help ensure aircrews always stay one step ahead to achieve mission readiness.



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CAE Civil Helicopter Training Programs

AgustaWestland AW109 – Sesto Calende
AgustaWestland AW139 – Kuala Lumpur (2013),
New York, Sesto Calende
Bell 212 / 412 – Bengaluru, Dubai, Mexico City
Eurocopter AS332L/L1 Super Puma – Stavanger
Eurocopter AS332L2 Super Puma – Aberdeen
Eurocopter AS350B2 Astar – Phoenix
Eurocopter AS365 Dauphin – Bengaluru

Eurocopter EC-225 – São Paulo (2014)
HAL Dhruv – Bengaluru
Sikorsky S-61 – Stavanger
Sikorsky S-76B, S76C+ – New York
Sikorsky S-76C++ – São Paulo, Vancouver,
ZhuHai
Sikorsky S-92 – Rimba (2014), São Paulo (2014),
Stavanger (2014)

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Kaman Corporation is realigning, streamlining and expanding its aerospace operations to ensure that customers receive the full benefits of the global company's growing design, manufacturing, testing and tooling capabilities and its highly experienced engineering workforce.

Rotorcraft remain an important part of the \$1.5 billion corporation's portfolio under the leadership of Greg Steiner, president of Kaman Aerospace, and Jim Larwood, president of the Aerosystems division.

Rotorcraft Excellence

Now supporting the U.S. Marine Corps in Afghanistan, the K-MAX[®] unmanned aerial system has taken center stage among rotorcraft offerings. The Marines have called the Unmanned K-MAX, developed with Lockheed Martin from Kaman's K-MAX utility helicopter, a life-saving combat multiplier with unequalled ability to deliver cargo to troops "when weather, terrain or enemy actions pose an unsuitable risk" to manned helicopters or ground convoys.

The Unmanned K-MAX to date has carried more than 2.2 million pounds of materiel to combat forces in over 840 missions while reducing the risk of death or injury for Marines who previously moved supplies by manned helicopters or ground convoys. The Marines have extended the two-aircraft system's deployment and expanded its operating area in Afghanistan. The Unmanned K-MAX's life-saving benefits led the editors of *Popular Science* magazine to name it as the 2012 Grand Award Winner in Aerospace in their "Best of What's New" honors, which for 25 years have recognized groundbreaking new technologies. *Aviation Week & Space Technology*, one of the world's top aerospace magazines, also honored the Unmanned K-MAX team, naming it as winner of the

2012 Program Excellence Award for System-Level Research & Development and System Development and Design. In addition, the American Helicopter Museum and Education Center in West Chester, Pa. honored the Unmanned K-MAX team with its 2012 Achievement Award for its "innovative application of helicopter control technology to address challenging operational needs of the U.S. armed forces."

The commercial K-MAX to date has successfully flown over 285,000 fleet flight hours in the firefighting, logging, and powerline construction industries worldwide.

The company's HeliworX[™] full-service aerospace innovation and manufacturing support center is advancing helicopter composite rotor blade technology, with production



The Unmanned K-MAX, above, is supporting the U.S. Marine Corps in Afghanistan. Right: Kaman's robust design and manufacturing capabilities support production of blades, cockpits, fuselages, and other critical components.

under way for Kaman, Bell, Boeing, MDHI and Sikorsky helicopters.

The proprietary Hontek three-layer, sprayable erosion coating provided by Kaman has significantly extended U.S. Army BLACK HAWK main rotor blades' lifespan and reduced life cycle costs. Kaman has installed a robotic coating facility at its Bloomfield, Conn. site and to date has coated over 2,500 BLACK HAWK blades.

Kaman also is actively marketing the highly capable, mission-ready SH-2G(I) Super Seasprite to international naval customers. The aircraft offers an affordable small-ship capability to counter surface, submarine and asymmetric threats.

A wide range of rotorcraft operators, from U.S. special forces and military services of other nations to civil operators of Bell Helicopter and MD Helicopters aircraft around the world, benefit day to day from the advanced structures, main rotor blades and bearings designed, built, tested and supported by Kaman.

Investing in Growth

Kaman is building its extensive capabilities through acquisitions and investments in facilities and people. Those capabilities include design, metal and composite manufacturing, testing, tooling production and support of cockpits, fuselages, tail rotor pylons, flight control bearings, bushings, blade-erosion coatings and driveline couplings, as well as main



and tail rotor blade manufacture, repair and overhaul. The heart of those capabilities is Kaman's 200-plus engineers; roughly three quarters of them have more than 15 years of experience.

"With our legacy as a rotorcraft OEM, our broad capabilities and our highly experienced engineers, Kaman is uniquely positioned to meet customers' requirements," said Steiner. "Realigning ourselves as One Kaman will ensure that all of our expertise is focused on efficiently helping our customers succeed."

One Kaman brings all of Kaman's aerospace operations under Steiner and streamlines the organization in two major units: Aerosystems and Engineered Products. Those units are organized according to functional requirements rather than products. Led by Larwood, Aerosystems consists of four divisions: Air Vehicles and MRO, Composite Structures, Engineering Services, and Metallics and Assembly. Engineered Products reports to Steiner and includes the Fuzing & Precision Products Division and the Specialty Bearings and Engineered Products Division.

Kaman also is streamlining design, manufacturing and testing. It applied continuous improvement processes in designing its Chihua-

hua, Mexico facility, opened in 2010 for low-cost metallic detail parts and assembly manufacturing, and its Jacksonville, Fla. lines producing cabins for the new-build Bell/Marine Corps AH-1Z and Sikorsky BLACK HAWK. Lean initiatives have accelerated rotor blade production.

The streamlining efforts complement Kaman's ongoing expansion of capabilities. In addition to the Chihuahua facility, Kaman in 2010 acquired Global Aerosystems, LLC, an Everett, Wash. provider of aerostructures engineering design analysis and FAA certification services. In 2011 it bought Vermont Composites, Inc., a Bennington, Vt.-based leader in composite aerostructures design and manufacture. Last year, Kaman agreed with Kineco Private Ltd., one of India's leading composites manufacturers, to establish the Kineco Kaman Composites-India Pvt. Ltd. advanced composite structures manufacturer in Goa, India. Kaman's global footprint already included facilities throughout the U.S. and in the U.K. and Germany.

A 5,100-employee workforce is building on Kaman's pioneering history.

For more information:
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FLYING THE MD540F

MD Helicopters

MD Helicopters gave *Rotor & Wing* the opportunity to become the first aviation publication to put the 540F through its paces.

By Ernie Stephens, Editor-at-Large

They say that the best situation an aircraft manufacturer can be in is to have a product that both the military and the civilian worlds want. Very few have been able to continuously satisfy both sectors with a single hull design. But MD Helicopters (MDHI) based in Mesa, Ariz. is one of them.

In 1963, Hughes Helicopter Co., the birth name of MDHI, introduced the OH-6 “Cayuse,” a light, single-engine, turbine helicopter that looked like a flying egg. But say what they wanted about the little reconnaissance aircraft, its speed and agility made it perfect for snaking around the jungles of Vietnam, and its egg-shaped hull provided the most crash-worthy cabin in the Army’s inventory.

In 1984, the OH-6 was redesigned into the AH-6 “Little Bird” attack/reconnaissance helicopter. Its agility, coupled with an assortment of wing-mounted weapons, has made it the helicopter of choice for the Army’s elite 160th Special Operations Airborne Unit. And although MDHI’s previous owner, RDM Holdings, sold the design rights for the AH-6 to Boeing in 2003, current owner Patriarch Partners bought at least some of those rights back, and now builds a portion of the tough little helicopter—designated the AH-6M—and the AH-6i light attack helicopter as a Boeing subcontractor.

Meanwhile, MDHI’s MD500 line—a civilian version of the OH-6—has enjoyed great success as a police and power line patrol platform in its D, E and F models. A 500M variant called the “Defender” has seen service with the armed forces of several small countries, but with fewer accolades.

The last ship in the 500 line to be certified was the MD530F, with its increased main rotor and transmission ratings. Those features, plus other changes and upgrades, gave the F model substantially increased high-hot-heavy capabilities, and a service ceiling that was 4,800 feet higher than

Though still in development, the MD-540F is showing the potential to be a superior warrior.



The six-bladed rotor system gives improved handling over previous models in the 500 line. Hard banking is smooth with minimal blade slap.

the E model when it was certified in the mid-1980s.

Now comes the MD540F, the company's state-of-the-art, armed helicopter. If the Boeing AH-64 Apache is the "big gun" of Army aviation, the 540F is a point scout packing a big sidearm and a very sharp knife. MDHI hopes it will be certified "soon," but no one would commit to a date.

Even with its weapons systems still in the integration stage, MDHI wanted Rotor & Wing to be the first publication to take the 540F for a test drive. So, out to their plant near Phoenix I went to see what it would do. Chris Nehls, vice president of engineering, explained that the MD530F was built for the battlefield. "It's everything you'd want in [an armed] scout aircraft," he said. "We wanted to make it an affordable solution for both the U.S. military and foreign militaries."

The 540F is currently powered by the same Rolls-Royce 250-C30 gas turbine engine that's in the 530F. But the company will later install an even stronger Rolls-Royce powerplant. That engine will drive an all-composite, six-bladed rotor system specially designed for MDHI by Van Horn Aviation of Tempe, Ariz., giving the ship greatly increased lifting capability. But for now, the main rotor shaft flies with the same

six-bladed rotor system specially designed for MDHI by Van Horn Aviation of Tempe, Ariz., giving the ship greatly increased lifting capability. But for now, the main rotor shaft flies with the same

On approach to the flight line, I immediately noticed that the skids on the 540F were beefier. This is because the engineers are looking for a 3,800 to 4,100-lb. takeoff capacity for production models. That kind of weight, they determined, needed more robust skids than the standard 500-model tubes. So, instead of designing a brand new set, the 540F will come with the skids used on the heavier MD600 helicopter.

The back doors of the fuselage were gone from the aircraft to allow for the weapons wing, which can hold a combination of externally mounted guns, missiles and guided rockets. The wing also serves as a 62.1-gallon fuel cell, nearly doubling the approximately 2.8 hours of flying time provided by the main 64-gal fuel tank.

The targeting gear had been removed by its manufacturer, L-3, but I was told that it features the same general kind of in-helmet target acquisition system found in the Apache. The system aboard the 540F is also capable of showing each pilot exactly where the other pilot is looking, thus making crew coordination much easier. Nick Page and the ground crew had already done

a thorough inspection of N540HH, so after a quick walk-around it was time to board. Pilots who drive civilian versions of the MD500 know that the pilot-in-command sits in the left seat.

But since military specification almost always call for the PIC to sit on the right, the aircraft's primary flight instruments favor the person on the starboard side. MDHI's policy—at least in aircraft still designated as "experimental"—is to put their pilot on the PIC side. So, I strapped myself into the left seat.

Once aboard, the 540F felt like the other members of its model line that I've flown. With a fixed seat, the only thing you can do to find a comfortable position is to move the pedals a few inches fore or aft. And for my 5'10" frame, that meant setting them as far away as possible. As for proximity to the cyclic, what you have is what you have.

The size and shape of the instrument panel is typical for a latter-day, civilian 500. The instrument panel is T-shaped, but narrow enough to easily see around for steep approaches.

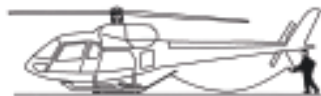
The engineers installed three multi-function displays. From left to right, the largest screen is an Elbit Systems moving map with navigation and battlefield situational awareness capabilities. The top-right module is a split-screen Garmin G500H displaying primary flight information. On the lower portion of the console is a backup glass instrument display, along with a standard Garmin GNS 430 GPS/radio transceiver.

The lower console houses a targeting control system, communications head, and a weapons control panel for managing the things that make stuff on the ground blow up. All instruments, switches and controls were easy to consult and reach. Even the bright sunshine didn't cause any problems with the displays.

Cranking the 540F was straightforward. Page executed a modulated start, holding the igniter switch for just

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a couple of seconds before the compressor reached its 12 percent light-off minimum.

After completing the pre-takeoff checklist, Page hopped the ship over the fence of the company ramp, set us down on Taxiway Echo at Falcon Field (FFZ), and waited for the tower to clear us for departure to the training area six miles northeast. When it was received, he turned the controls over to me.

Having logged many hours in MDHI products, I was already used to the heaviness of the unboosted cyclic, which tends to disturb most other pilots who are accustomed to hydraulically assisted sticks. In fact, only 3 oz. of hydraulic fluid is aboard the aircraft. It resides in a small mechanism mounted under the flight deck that dampens rotor-induced cyclic kickback. But bumping the trim control on any 500-model's cyclic will alleviate that stiffness, making the aircraft very easy to fly. (For those used to flying a 500, the 540F's trim motor is noticeably faster!)

Climb-out was spritely in the calm wind. And with a takeoff weight of approximately 3,100 lbs., it was easy to tell that the engine and rotor combination upgrade produced a substantially more powerful ship than previous 500s.

The 540F's field of view is excellent, except for the issue that plagues all of MDHI's 500 models. The doorframe closest to you, being about 4 inches wide, can be right at eye level for pilots around my height. One remedy is to slouch or bend down when turning to look in that direction. Flying with the

The same 650-shp Rolls-Royce 250-C30 powering the older MD530F is installed in the experimental MD540F. By the time it goes into production, it will have a more powerful RR engine.



Photo by Ernie Stephens



Photo by Ernie Stephens

The MD540F can carry a variety of missiles and guns on each end of its weapons ring. The structure doubles as a 62.1-gallon auxiliary fuel tank.

doors off is the second cure.

Once out over the practice range, I put the 540F through its paces. The MD500 line has always been a well-mannered aircraft that won't do anything until you give it permission, and this one was no different. The collective didn't wander. The pedals moved easily, and there was that great feedback in the cyclic that let me know that it was working for me, not vice versa.

MDHI's engineers made the right call with the new rotor system. Whether I eased the aircraft into a bank or threw it on its side, the blades executed the maneuvers smoothly and with less blade slap than its five-bladed predecessors. Even while heeled over in a 70-degree bank, "dirty" from its weapons wing, the 540F seemed happy to comply, and could have taken much more, I suspect.

Hauling the 540F from a 90-knot cruise into an out-of-ground-effect hover was so uneventful, it could have put me to sleep. As it passed through ETL I could really feel the power of the two-bladed tail rotor as it bit into the air. The unnerving shake that is common in the MD520N's NOTAR (no tail rotor)

design was also missing, and there was an abundance of power remaining as the airspeed indicator reached zero. Getting back underway was equally smooth.

In an effort to see how much speed we could get out of the 540F, I returned the controls of the aircraft over to Page, and asked him to drive us up to the first limiting factor, which on this day was going to be torque. With him holding the aircraft at the top of the green, it delivered 128 KIAS (133 TAS) straight and level at 1,960 feet MSL on a 23° C day with an altimeter setting of 29.93. Not bad at all.

Normally, I would check to see how well an aircraft autorotates. But because the 540F is still under development, certain flight maneuvers have yet to be approved, at least for demonstration purposes to an outsider. So, the flight concluded with a variety of approaches and takeoffs back at Falcon Field, along with some playtime in ground effect. No problems, no surprises, and no complaints.

Since my opinion of the MD540F is limited to how it flies, as opposed to how it fights, I can only say that current and former OH-6, MD500 and AH-6 pilots will be quite impressed with this design. They took a more-than-capable light attack scout and, to quote MDHI's president and CEO Lynn Tilton, "...gave it attitude." 🚁

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Public Service

By Lee Benson

Bridge to Somewhere

We have all heard about “the bridge to nowhere.” What about a bridge to somewhere? Somewhere can be improved aviation capabilities en route to the U.S. Army’s Aim Point 2030. The challenge is with aviation leadership’s willingness to actually be the honest broker and analyze the benefits of the bridging technology available to them. A 200-plus-knot cruise speed for a Black Hawk helicopter will go a long way as a bridge to the Army’s Aim Point 2030.

The U.S. military faces challenges from sequestration, budget deficit, and the need to maintain a strong military. It will take more than a big cut in defense spending to balance the budget this time. If Congress does its job, this will greatly affect the defense budget and might delay aviation leadership’s ability to meet the Aim Point 30 goal for Future Vertical Lift (FVL) integration into the Army. With the focus by Congress and DoD, Black Hawk operators would not have to wait for FVL for improved capability. Sequencing particular technologies into the existing Black Hawk fleet, would demonstrate technologies prior to incorporation into subsequent FVL programs, resulting in cost and risk reduction. These modifications would increase near-term capability, safety and survivability. Improvements can be obtained as early as 2020—200+ knot cruise speed, improved agility, maneuverability and survivability, and operational range. Improved maintainability/reliability, reduced fuel and maintenance costs can be attained.

This is a way to bridge capability gaps identified by the joint services in the August 2010 Report to Congress: “A Strategic Plan for U.S. Department of Defense

Vertical Lift Aircraft.”

Piasecki Aircraft Corp. pioneered compound helicopter flight. A compound helicopter is a helicopter augmented with auxiliary lift and thrust. Piasecki modified a preproduction UH-60 Seahawk with wings and a ducted fan. The modification is about a 30 percent modification of the existing Black Hawk. The pilot controls the fan in a similar manner as controlling the tail rotor. The fan replaces the need for a tail rotor and provides thrust for faster flight and improved lift. Phase I test confirmed increased performance, survivability and affordability. The test aircraft cruised at 180 knots (maximum based upon NATOPS regulation), has twice the range of the current UH-60 and 50 percent less vibration than the test UH-60 did prior to the mods. The addition of wings provides for additional fuel and enables the aircraft to fly in a flat mode versus nose down at high speeds.

Phase II—if or when funded—will confirm Phase I projections that the aircraft can meet or exceed the key performance objectives. Phase II program objectives include the addition of a supplemental power unit (SPU) to power the ducted fan. This modification removes the need for 500-700 SHP from the main engines to drive the tail rotor and essentially frees up the additional horsepower to provide lift for the aircraft. The SPU provides power for the ducted fan. The reduction in power needed to drive the tail rotor is now used for lift, greatly improving hover performance and airspeed. The cost of such an effort can be mitigated if leadership allows itself to be innovative.

There is potentially a way to mitigate development costs. The Army gave priority to the Improved Turbine Engine

Program (ITEP). This improvement requires a new transmission and a new tail rotor. Improved speed is not a benefit of the modification. The benefit is improved lift.

Objectives of FVL came from various studies conducted by the joint services and rolled into the August 2010 report. Aviation leadership set the year 2030 to begin operational flights for FVL aircraft. This is approximately 17 years from today. If one looks at the lessons learned, this cannot happen with the government bureaucracy involved—Comanche and V-22 both exceeded 20 years in development. Sikorsky and EADS/Eurocopter—using their own funds—developed the X2 and the X3 (X-cubed), respectively, and mitigated many of the capability gaps identified in the Report to Congress. The development times will be less but still will take time. The large and cumbersome military development system slows fielding of even the simplest equipment item when the equipment requires attachment to the aircraft structure.

Black Hawk production is expected to run through 2025. This could be decreased or increased by the funding provided by Congress. The compound modification can be certified rapidly with the correct attention of leadership and the modification integrated into the production and the rebuild lines. Both would save on cost while the bridge to the future vertical lift provides the joint forces improved capability in speed, range, survivability, maintainability and reliability. The Compound Black Hawk should be combined with the improved turbine engine effort to provide more than just improved lift. The speed can compensate for a smaller military force. 飛



Coming Up

in rotor & wing

February 2013:

Bell 525 Relentless Progresses—Bell Helicopter invited *Rotor & Wing* to witness the continuing development of the 525 Relentless “super medium” twin, which is projected for first flight in mid-2014. Larry Timmesch, vice president of commercial programs, and David King, chief engineer for the 525, provided an overview of the helicopter, including its Garmin G1000H avionics, General Electric CT7 engines and other components.

Q&A with Marc Paganini—The American Eurocopter President & CEO spoke with Editor-in-Chief Andrew Parker on a wide range of topics during an exclusive interview, including the outlook for North American markets and his organization’s involvement with the Army AAS voluntary flight demonstrations and X³ (X-cubed) U.S. demo tour.

Heli-Expo Preview—The helicopter industry revolves around the hallmark annual event, set to take place from March 5-7 in Las Vegas, Nev. Heli-Expo 2013 is poised to bring together hundreds of operators, suppliers and vendors from around the commercial rotorcraft industry. We’ll supply the details on who’s coming, what they’re bringing to display and what to expect during the three-day event.

Elbit Systems of America—ESA has grown into an influential and dynamic defense industry player, and CEO Ranaah Horowitz intends to turn lessons learned through the recession to help plan for the future (with a little help from the parent company in Israel). Specialization and good user feedback have been essential.

Bonus Distribution: Avionics Europe, Feb. 20-21 in Munich, Germany.



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Military Insider

By Andrew Drwiega

A Happy New Year?



In kicking-off this first issue of 2013 in a change to the usual format of this column I now intend to devote it a selection of smaller items that may be pressing, current, historic or that just take my interest—as long as they all have a bearing on military rotorcraft and the people who use them:

Christmas Sequestration

[In front of a toy store window]

Bob Cratchit: Well, my loves, which one do you like best, eh?

Kathy Cratchit: I like the dolly in the corner.

Tiny Tim: I like all of them.

Bob Cratchit: Good boy? And why not one in particular?

Tiny Tim: Well... you said I can't have none of them, so I might as well like them all. *(With apologies to Scrooge)*

So what did Santa have in his sack for the boys and girls who defend the United States? Well, at time of writing in mid-December he was actually looking to cross stuff off their lists and give them less. The prospect of sequestration was due to come into effect on Jan. 2, 2013. But before Christmas it was in the minds of those in the DoD more than yuletide merriment. And they weren't at all pleased it had come to this.

In a DoD statement issued in early December, Pentagon Press Secretary George Little said internal planning for sequestration had begun in cooperation with OMB. He very much hoped that it would not result in the DoD going "off a fiscal cliff." However his self-evident contempt for the situation burst through: "If this is triggered, even in light of this absurd mechanism that was created to avoid absurdities, our intent is to not implement sequestration in an absurd way ... inside DoD." Had he added the phrase "bah humbug" (aka "nonsense"

or "gibberish"), his Christmas message would have been seasonally complete.

Happy FMS to All

In September 2012 the Defense Security Cooperation Agency announced a possible military sale of eight Boeing AH64-Es to Indonesia. This is the aircraft currently being fielded by the U.S. Army to replace its own old AH-64Ds of Block I and Block II vintage.

While the U.S. defense industry is scouring the world for orders of any size to hopefully make up the shortfall, the political scene is also changing and countries that previously may have been blocked or restricted from purchasing higher levels of defense technology are now openly courted for business. The Indonesian and Iranian presidents met in November with both agreeing that the solution to the Syrian conflict must lie within the country (although Iran is believed to be supplying weapons to the Syrian regime through Iraq). However, in the wider strategic picture Indonesia is also one of the countries that is being geographically challenged by China's territorial claims, specifically in the South China Sea (together with its regional neighbors including Vietnam, Malaysia and the Philippines), so the U.S. senses the opportunity to support those who could help to buffer China's regional ambitions. A further positive influence on U.S. policy could be linked to President Obama spending four years of his childhood in Indonesia's capital, Jakarta. Obama has encouraged good relations between the U.S. and Indonesia, which is in the process of modernizing since the lifting of a six-year arms embargo in 2005 (for human rights abuses in East Timor).

New Year Resolutions

The aviation industry needs to establish a resolution to improve on the delivery

of aircraft to the end users. Although this is not news, there needs to be a collective drive to instill this as a top priority. The completion of the Sikorsky CH-53K ground test vehicle is a landmark event but the wider picture of the length of the program schedule to provide replacement helicopter to the USMC shows a timeline from "soup to nuts" which stretches over 15 years, and that is just to reach the full rate production decision.

The GAO Assessment of Major Weapons in March 2012 showed the program start point as November 2003 with the full rate production decision not due until May 2019 (initially it was September 2015). With 200 aircraft currently on order (raised from 156 in 2008), prior to any budget cuts or even the impact of sequestration in early 2013, the final aircraft will be delivered to the user around 20 years after the need was formalized. Sikorsky will naturally argue that the latest variant is a new helicopter in that it can lift more, much more at 27,000 lbs over 110 miles, than the CH-53E Sea Stallion that is replacing. But USMC no doubt bought into the CH-53K proposal thinking that it was a relatively low-risk strategy. Sikorsky sold it no doubt on the basis that they had decades of experience in manufacturing the type. Actually the fledgling aircraft, YCH-53A, first took to the skies on Oct. 14, 1964. With a constant commitment to the type and all the subsequent models since, it is concerning that either Sikorsky's development were either too ambitious when conceived, or that the Marine acquisition requirements had some bearing on the schedule delays. Either way, lengthy acquisition programs must be shortened for the industry to improve its credibility as the second decade of the 21st century marches on. 🇺🇸

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