

## Manufacturers continue building new models to meet the global demand

by Andrew Healey

**Last year** was a good one for the helicopter industry. Aerospace Industries Association figures indicated that the export performance of U.S. civil helicopter manufacturers is currently at "record levels." Sales activity represented what the association called a "surge" in export activity for the sector—up nearly 60 percent over the previous year.

According to the report, overall civil helicopter sales activity—domestic as well as exports—grew to a record \$750 million, the equivalent of 120 more aircraft than manufacturers delivered in 2004.

More specifically, last year turned out to be the year a lot of decisions were made—for good or for ill. We know now who will build the President's next helicopter, that the BA609 can indeed fly like an airplane and that—although many suspected it—something drastic needed to be done at MDHI.

We know that the Bell 427i needed more than just an autopilot and that the S-92, despite teething troubles and losing out on the U.S. Presidential contract, can walk the walk for offshore operators—over the freezing waters off

Newfoundland as well as the humid Gulf of Texas. It also scored a last-minute coup to provide SAR facilities in the UK. We heard, finally, that the V-22 Osprey will be built in bulk for the U.S. Air Force and Marine Corps.

In addition, the U.S. embraced R&D for helicopters. Bell revealed more about its MAPL (modular affordable product line) project, which includes an innovative anti-torque device, and Sikorsky introduced a new concept in rotorcraft design that offers an aircraft with a potential VNE of 250 knots. Actually it wasn't new at all—the OEM's advancing blade concept demonstrator flew back in the 1970s—but the technology required to make it a practical proposition is now in place (see AIN, July 2005, page 100).

But above all else, when it comes to a cataclysmic natural disaster—a tsunami, a hurricane, or an earthquake—the helicopter is the one vehicle that can bring swift and effective relief to the point of need. The assets are available and the operators are ready to respond: all it takes is money, coordination and the political will to make it happen.

### AgustaWestland A109S Grand

The order book for this uprated 109 variant currently stands at almost 60. AgustaWestland received EASA approval for the type in June (as its first customer, a Briton, took delivery) and FAA certification is expected by next month. The company planned to have delivered five airframes by press time and 10 more later this year.

The Grand draws upon the high-altitude



A109S Grand

performance record of the out-of-production A109 K2 and is aimed at the search-and-rescue (SAR) market. Sliding doors on both sides of the cabin offer improved access and, as such, should attract public-service operators as well.

The FADEC-equipped Pratt & Whitney Canada PW207C turboshaft engines, providing a combined 815 shp, and an uprated transmission give the Grand good performance in terms of hovering-out-of-ground-effect and speed in forward flight.

According to the company, the 7,000-pound-mtow helicopter has a 12,000-foot ceiling on a single engine and, with both powerplants running, offers a rate-of-climb of 1,900 fpm. AgustaWestland also claims that operating costs are up to 36 percent lower than its competitors.

### US-101

The U.S. military selected a variant of AgustaWestland's EH-101 as the new Presidential helicopter last year. Development of the helicopter—christened the VH-71A Kestrel—is now under way. A first airframe, which will serve as a testbed until three actual test vehicles arrive in the spring next year, landed at a U.S. Navy test facility in November,



US-101

and the air and ground crews immediately began familiarization training.

Technically, the test helicopter is a leased Italian Navy EH-101. Because of the program's tight schedule (first deliveries are slated for 2009), program managers decided to lease an airframe to get a head start on flight and maintenance training. Testing on a real helicopter will also help the program team figure out where to place antennas and other airframe-mounted devices.

Engine integration testing of the VH-71A began on a contractor vehicle during the summer, at Lockheed Martin's Owego, N.Y. facility.

### Bell Helicopter Bell 210

The Bell 210 achieved FAA certification in July, 18 months after launch and seven months after first flight. The Huey lookalike features dynamic components from the Bell 212 (main rotor hub and blades, tail rotor, main and tail-rotor support structure, transmission, rotating controls and tailboom), and a Honeywell T-53-517BCV engine. The result, according to Bell, is a zero-time, FAA-certified, single-engine medium utility helicopter for about \$3 million, compared with \$5 million for a similarly sized off-the-shelf commercial product.



Bell 210

Bell said the 210 has direct operating costs of less than \$650 per hour—offering what the OEM terms a "significant reduction in operating costs"—and comes with an "excellent" commercial products warranty. An airframe will be on display at Heli-Expo later this month in Dallas. First deliveries are scheduled for May.

### Bell 429

Program development of this IFR twin is proceeding on schedule with Transport Canada and FAA certification expected during the third quarter of next year. Bell said it has taken nearly 140 orders for the new helicopter, which will enter a market sector crowded with established types.

Modified Bell 427 prototypes are already

flying with Model 429 components, and first flight of the complete airframe is scheduled for the third quarter. At press time, Bell had successfully completed concept demonstration tests, wind-tunnel tests and inlet and exhaust testing. Detailed design is nearing completion, and the company is building parts and tooling to construct the first prototype.

The Bell 429 will be the first to feature new MAPL components, including a 70 percent larger cabin (compared with the earlier Bell 427i) and a new composite horizontal stabilizer that was test-flown last May. Work continues on anti-torque



Bell 429

devices, including a rotorless assembly known as PATS (propulsive anti-torque system).

Bell plans this year to run an engineering ground-test rig using a full-size gas turbine engine, inlet fan, bifurcated ducting and a series of test thrusters. PATS provides anti-torque directional control and propulsive thrust without a conventional tail rotor. Combined with reductions in main rotor speed, it could enable helicopters to cruise comfortably at 160 to 170 knots.

### Bell/Agusta Aerospace AB139

With the AB139 now certified and being delivered around the world, Bell/Agusta's new challenge is to keep its production rate in step with customer demand. With more than 100 airframes on order and capacity still set at around 50 per year, the company will have to juggle numbers and customers for some time to come. The recent announcement of an extension of the Philadelphia facility to accommodate a second and domestic AB139 line has not come a moment too soon.



AB139



With the roles of the AB139 becoming as diverse as those of the smaller A109—from flying limo to search-and-rescue—Bell/Agusta has stolen a march on the competition. If it manages to keep all its customers on board, it can expect to continue doing well, perhaps even until the Sino-European EC 175 (see below) enters the fray in 2011.

Bell is to sell its 25-percent interest in the program to AgustaWestland (giving the company complete ownership) so the helicopter will be renamed the A139. Incidentally, AgustaWestland has launched a military variant, christened the A149.

### BA609

The tiltrotor can now hover like a helicopter and fly forward like a turboprop. Bell/Agusta restarted the flying program last summer, and the aircraft converted fully to airplane mode in July and progressed rapidly to expand the flight envelope—up to 255 kcas and 15,000 feet. Before grounding it again for “adjustments,” the crew also demonstrated 2g positive and 0g negative in airplane mode.

A second prototype is preparing to join the flight program in northern Italy. With live data linkage between Italy and Texas, testing has become a continuous process. Every change made to aircraft one is repeated, often in real-time, on the aircraft-two setup in Italy. Milan retains program lead with the introduction of a third aircraft nearing completion in Italy, and a fourth “green” example is currently in the Bell XworX hangar at Fort Worth, Texas.



BA609

AgustaWestland has also taken an increased 40-percent stake in the BA609 program.

### Eurocopter

In September, Eurocopter’s experimental BK117 lifted off from its Donauwörth, Germany site for the first time with an electrical flap control system. Adaptive rotor systems promise to reduce vibration as well as the noise caused by rotor blade tip vortices.



Eurocopter AS 350 B3

The FAA has approved Eurocopter’s request to build 350 B2 and B3 AStars at its U.S. facility in Columbus, Miss.

### EC 225

This new-generation Super Puma entered service last year with the government of Algeria (as a presidential transport) and on



EC 225

North Sea duties with Bristow Helicopters. It was certified for unrestricted operations in icing conditions in time for the northern winter and, by next year, a new FAA level-D simulator will be commissioned in Marseilles, France.

The EC 225 has a maximum weight of nearly 23,000 pounds and can carry two pilots and 24 passengers or more than 11,000 pounds of cargo. Its twin Turbomeca Makila 2A engines deliver a cruise speed of 149 knots.

### EC 175

Aviation Industries of China (AVIC II) and Eurocopter have agreed to jointly develop a new six-ton (13,230 pounds) helicopter—the EC 175—to fill the niche between the five-ton AS365 Dauphin and the 10-ton Super Puma.

A five-year development phase is due to start soon. The new civil type is scheduled to make its first flight in 2009, with European and Chinese certification, and production, set for 2011.

Each company will invest \$322 million to develop the new helicopter. Production will be shared on a 50/50 basis and each country will have its own assembly line. Sales forecasts suggest a potential worldwide market for some 800 helicopters over the next 20 years.

Eurocopter president Fabrice Brégier said, “The program guarantees more than 30 years of work and 2,000 high-tech jobs for Eurocopter and its partners. Over 20 years, the program will be worth close to €10 billion (\$10.7 billion).”



EC 175

The EC 175 will have a five-blade main rotor and an energy-absorbing airframe. It will be certified for two-pilot IFR and single-pilot VFR operations and carry up to 16 passengers. The helicopter will have a radius of action of 200 nm at a speed of 151 knots.

### FH1100 Manufacturing FH1100

The company has upgraded its FH1100 with a new EFIS cockpit, replacement stainless steel rotor blade and a KaFlex lubrication-free driveshaft. President Georges Van Nevel told AIN that the company will display a latest-build model FH1100, based on the original Fairchild Hiller that first

flew in 1963, at this month’s Heli-Expo.

Owners of existing aircraft will be able to install the improvements as a retrofit, although they will also have to install the latest Rolls-Royce 250-C20B engine, which currently powers only a handful of the 80-odd original FH1100s still flying. The rest use the obsolete-C18 unit.



FH1100

The company claims that the FH1100 has the lowest operating costs in its class. The FAA has yet to issue a production certificate for it, and Van Nevel could not predict when one would be forthcoming. “However it is a two-year process and we are getting to that point now,” he told AIN.

### Groen Brothers Heliplane

This new gyroplane is a revival of Britain’s Fairey Rotodyne that flew in the late 1950s and achieved 166 knots forward speed, a record at the time. The Heliplane project is being funded by DARPA (Defense Advanced Research Projects Agency) with a combat search-and-rescue role in mind. Potentially worth \$40 million, the work could lead to flight testing of a technology demonstrator, based on Adam Aircraft’s A700 very light jet, by mid-2008.

The objective for the demonstrator will be a twofold improvement in forward-flight performance over a conventional helicopter, including a 350-knot cruise speed and 1,000 nm range with a 1,000-pound payload. The goal is a lift/drag ratio greater than 10, compared with five to six for a conventional helicopter and 15-plus for a fixed-wing aircraft.

Groen’s concept uses a reaction-drive rotor, with tip jets powered by compressed gas from an engine mounted in the belly of the aircraft. The rotor will be powered for vertical takeoff and landing, but will autorotate during forward flight. To reduce drag, the rotor will be slowed and lift transferred to the wing, as forward speed increases. A pair of Williams turboprops will power the Heliplane but



Heliplane

the company added that it has not yet evaluated turboprops.

### Hindustan Aeronautics Dhruv

The HAL Dhruv is a multi-role helicopter in the 12,120-pound weight class built to meet FAR 29 and certified by India’s Director-General of Civil Aviation (DGCA). Currently powered by two Turbomeca TM333-2B2 engines, it is claimed to meet Category “A” takeoff and landing performance requirements.

First civil deliveries of the Dhruv are said to be “imminent.” The first of two helicopters for the regional government of Jharkhand is ready, with the second due for completion later this year. A reported order for 20 civil airframes, from Mumbai-based offshore operator Azal Aviation, never advanced beyond memorandum of understanding stage. However, AIN has learned that a recent change of management at Azal might present new opportunities.



Dhruv

Normal seating capacity is two crew and 12 passengers or 14 passengers in a high-density configuration.

Turbomeca’s upgrade of the TM333, known in Europe as the Arden and in India as Shakti, is designed to deliver an additional 10 percent performance and is currently under dynamic test in southern France. HAL gets a 30-percent offset in the unit’s development package. A joint-venture company is currently being set up with Israel Aircraft Industries (IAI) to market the advanced light helicopter, in return for HAL’s installing IAI avionics into the platform.

### Kamov Ka-32

With certification or validation held in six countries outside Russia (Canada, South Korea, Mexico, Spain, Switzerland and Taiwan), Kamov will seek approval for the export variant of its specialist loadlifter from the European Aviation Safety Agency this year. Last year the OEM established a service

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center in the Republic of Korea and plans to open another in southern Spain by July.

Logging and firefighting are the Ka-32's main roles. Spain's government recently recognized the type as a principal rotary-wing asset in responding to serious fires (defined as those covering more than 1,235 acres). Neighbor Portugal, which also depends on helicopters to contain summer fires, is said to be a potential customer.

Similar contracts are being negotiated farther east, in Cyprus and Turkey. Leased Ka-32s are also in Greece, and some 40 are already flying in South Korea on utility and coast guard duties.

### Ka-32



### Ka-115

A full-scale mockup of this new utility single was exhibited at an airshow in Moscow last summer. Funding is currently being sought to encourage the OEM to start building a working prototype.

Another co-axial rotor design, the Ka-115 has a single engine and should deliver a 372- to 434-mile range. Despite its basic configuration, it will include rotor blade de-icing and engine anti-icing as standard. The company is currently targeting the domestic market.

### Ka-226

Kamov is seeking FAA certification for this lightweight (7,480 pound) twin this year. The Ka-226 has a replaceable cabin "pod" enabling quick interior changes, such as from a six-place passenger interior to EMS configuration in less than an hour. With the cabin detached, the helicopter can carry 2,860 pounds underslung.

Production of the Ka-226 started in 2004. Rolls-Royce is contracted to supply 50 additional 250-C20R engines for the program this year. Turbomeca's Arrius 2G2 is also listed as an option.



### Kazan Aktai

Still being prepared for flight tests, now expected "sometime in 2006," the Aktai is designed for commercial VFR operations

carrying passengers or cargo, as well as search-and-rescue operations.

It is equipped with a simplified main rotor hub with elastomeric hinges and composite main and tail rotor blades. The helicopter is powered by a single VAZ-4265 piston engine.

### Aktai



The Aktai's main design principle, said Kazan, is to provide simple and low-cost operations combined with decent flight performance.

### Ansats

Production of this light twin started in 2004 and five airframes are now in service with South Korea's forest service. Its sole Russian certification is aligned with FAR/JAR-29 standards.



### Ansats

### Mi-38

In partnership with the Mil design bureau and Eurocopter, Kazan continues to develop the latest Mi-38 (based on the ubiquitous Mi-17 transport), with plans to begin flight testing next year. Three variants—VIP, passenger transport and medevac—will be offered. The plan is to meet FAR/JAR 29 requirements and be suitable for single-pilot IFR operations in temperatures ranging from -60 degrees C to 50 degrees C.



### Mi-38

According to Kazan, the helicopter's performance and fuel consumption will offer "significant advantages" over other types in its class. Its PW-127T/S engines, rated at 2,500 shp, were developed by a Pratt & Whitney Canada/Klimov joint venture and enable the helicopter to carry up to 13,200 pounds internally or 17,600 pounds externally.

The helicopter has an EFIS cockpit and the airframe features composite blades

with increased service life, "anti-vibration crew seats" and a large cargo compartment. Triple-redundant electric and hydraulic systems are also included.

### PZL Swidnik SW-4

Celebrating 50 years of helicopter manufacturing this year, the Polish manufacturer is close to UK CAA certification of its SW-4 light single, after which EASA approval will be sought. The company has signed a deal to purchase 10 Rolls-Royce 250-C20R light turbine engines for the program.

Company spokesman Jan Mazur says PZL has also signed a memorandum of understanding with Rolls-Royce, to pursue the idea of using the 650-shp 250-C30 to power a SW-4 growth variant. "Upgrading the engine would be a relatively easy procedure," he said, "due to the R-R unit's small size and high parts commonality with the current unit." The SW-4 is claimed to deliver ranges approaching 500 miles.



### SW-4

Poland's army has ordered 30 airframes for use as trainers, and a further 40 sales may go to the country's navy and air force. The first civil variant was delivered in December for use on gas pipeline patrols in eastern Russia. "If it proves its worth," said Mazur, "a substantial follow-on order may follow."

### Sikorsky S-76D

Launched at last year's Heli-Expo in Anaheim, Calif., the S-76D variant will feature composite rotor blades, a quiet tail rotor, a rotorcraft icing protection system (RIPS, which was recently certified on the S-92), a Thales cockpit with an integrated avionics system and P&WC PW210 engines.

An announcement about the blade supplier and wind-tunnel tests was expected at press time, and a full-scale mock-up,

complete with the Thales cockpit, will be on display at Heli-Expo this month. The first S-76D is planned for delivery by the end of 2008.

### X2

Sikorsky's new light helicopter, based on two contra-rotating rotors and a rear propulsion fan, promises a maximum speed approaching 250 knots. A two-seat demonstrator, to be built at Sikorsky subsidiary Schweizer at Elmira, N.Y., is scheduled to fly before year-end. The helicopter's fly-by-wire package has already taken to the air aboard a Schweizer 333 testbed.

### X2



Sikorsky CEO Steve Finger said the X2 will "maintain or improve" all the vertical flight capabilities of rotorcraft while still delivering the speed increase. "Aircraft such as the V-22 tiltrotor and the vertical-landing Joint Strike Fighter are compromises—they deliver the speed but at the expense of hover performance. We believe there is a market for a true helicopter that offers this significant speed increase, not only for the military but in civil applications such as offshore support."

Finger added, "A true helicopter that goes fast has the widest market potential; everything else is just niche."

The X2 bears a striking resemblance to Sikorsky's advancing blade concept demonstrator that reached similar speeds in the 1970s. That aircraft suffered particularly from vibration and inherent drag, drawbacks that Finger said the company has since overcome. "It's a matter of technologies developed over the past 30 years coming together."

The X2 fly-by-wire (FBW) system made its first flight at Elmira, N.Y., in November. The FBW testbed was said to perform "flawlessly" during the 30-minute flight, while demonstrating the basic capabilities of the Hamilton Sundstrand/Honeywell fly-by-wire package.



### S-76D