

New ROTORCRAFT 2012

Civil helicopter industry faces uncertain future

by Thierry Dubois & Mark Huber

Circumstances are colliding that will have significant impact on new civil helicopter development programs for the remainder of the decade. In the West, new civil programs are typically the byproducts of defense spending. And when it comes to dropping defense dollars and euros on new manned helicopter programs, the party might not be over, but it is definitely winding down.

In the U.S., automatic and deep Pentagon budget cuts likely will not be felt until Fiscal Year 2013 under the debt ceiling expansion and spending reduction deal fashioned between the President and Congress last summer, after the bipartisan congressional Super Committee failed to produce an alternative. However, the just-enacted FY12 National Defense Authorization Act is a reason for caution already. Helicopter defense spending is largely confined to programs that rebuild or modernize legacy airframes, including fitting some with unmanned control systems. One of the few exceptions is the \$2.2 billion authorized for continued acquisition of Bell-Boeing V-22 tiltrotors. However, the V-22 will become a prime target for cuts or elimination under any future budget. If this happens, it would be a setback for Bell, which is counting on continued V-22 revenues to help fund its \$1 billion, five-year accelerated R&D and facilities modernization program.

More significantly, Pentagon cuts could delay meaningful progress on its leading driver of new helicopter technology—the Joint Multi-Role (JMR)—deep into the next decade. The program is envisioned to field replacements for models that are currently the backbone of U.S. military aviation, including the AH-1Z Cobra and AH-64D Apache gunships, CH-47F Chinook, OH-58D Kiowa, UH-60M Black Hawk and the UH-1Y Huey. The Congressional Budget Office estimates the potential total cost of acquiring JMR aircraft at \$57 billion, or an average unit cost of approximately \$24 million.

In Europe, the defense segments of industrial giants EADS, parent of Eurocopter, and AgustaWestland (AW) owner Finmeccanica are already showing signs of strain thanks to decreased military spending and the ongoing euro crisis. Finmeccanica has already announced significant spending cuts and is pursuing restructuring after posting record losses. So far, this does not seem to be visibly affecting the company's new helicopter development programs.

For now, Bell continues work on its Magellan program, which is characterized in the broad terms of technology research as opposed to any specific civil program. Sikorsky, at its own expense, is developing the X-97 Raider compound helicopter, a potential JMR candidate, and that technology could later drive civil models. Likewise, Eurocopter is working on the X³ and AW has taken over the 609 civil tiltrotor program after ending its partnership with Bell last year.

At the same time R&D spending becomes more strained, demand for current production civil helicopters in certain segments is dropping off. The U.S. helicopter EMS industry fleet currently numbers approximately 900 rotorcraft but with not all of them in service the market appears saturated and faces continued consolidation. There were several acquisitions last year, including Air Methods' purchase of OmniFlight. Decreased local, county and state tax revenues also have caused the elimination or reduction of numerous helicopter law enforcement units.

However, the international market continues to show signs of growth, particularly among offshore oil and gas production (OGP) service operators, spurred on by \$100 per barrel oil and expanding deep-water operations. After a pair of high-profile accidents, both Sikorsky and Eurocopter are redesigning the main gearboxes of their heavy lifters aimed at this lucrative market, the S-92A and EC225, respectively. Eurocopter also is bringing a new medium twin on line this year, the EC175, aimed at this market. AW is offering a line of new medium/heavy twins to serve it, most of the Sikorsky S-76Ds on order are destined for it, and it is believed that whatever comes of Bell's Magellan will end up in a model designed to serve it. All this competition is good news for airframe buyers, who will continue to enjoy a wide variety of choices from both established OEMs as well as new/rejuvenated ones from China, India, Russia and other emerging players in a rapidly changing world market.

The international civil market may well have reached its nadir, with both the Honeywell and Rolls-Royce 2011 forecasts predicting modest sales increases for the remainder of the decade.

"While the market has not returned as quickly as the industry desired," said Patricia O'Connell, Rolls-Royce business sector president, "basic indicators are beginning to support a positive environment for civil rotorcraft."



AgustaWestland

AW149/189

AW announced the 149 program in 2006 and the 8.6-ton helicopter made its first flight in 2009. Based on the successful AW139 medium twin, the 149 is a military variant that is 12 feet longer, 4 feet taller, 5,000 pounds heavier (mtow), has a slightly larger main rotor disk and a pair of more powerful, Fadedec-controlled GE CT7-2E1 turboshafts (2,000 shp each) that give the helicopter good high/hot performance and satisfy the 6,000-foot, 95 degree F OGE standard. The air-conditioned 409-cu-ft cabin is 25 percent larger than that of the AW139 and the baggage hold offers 71 cu ft.

The AW149 can hold 12 fully provisioned troops or seat 18 passengers, cruises at 150 knots and has a maximum range of 635 nm. It has a full glass-panel avionics system that is NVG compatible, a four-axis autopilot and can be ordered with optional rotor ice protection. The AW149 was a contender for the Turkish Utility Helicopter Program but ultimately lost that competition to Sikorsky last year.

Following the loss of that contract, AW announced its intention to offer a civilian variant of the AW149, the AW189, aimed mostly at the lucrative offshore oil and gas industry. The AW189 is being marketed as a lower-cost alternative to the Sikorsky S-92A and Eurocopter EC225. With 12 passengers, the AW189 has the range to reach and return from platforms as far as 200 nm offshore. AW is offering the AW189 in offshore, VIP, search-and-rescue and parapublic variants. The helicopter made its first flight on Dec. 21, 2011. Both the 149 and 189 are expected to be certified in 2014, with the eventual goal of approval for single-pilot IFR.



AgustaWestland AW149



AgustaWestland AW189

AW169

AW announced the 4.5-ton-class AW169 medium twin program in 2010. The eight- to 10-passenger helicopter is being designed for single-pilot IFR operations and is expected to fly this year and receive certification in 2014. The 169 is intended to compete with the S-76D and even uses a pair of the same Pratt & Whitney Canada Fadedec-controlled



AgustaWestland AW169

PW210S engines (1,000 shp each) that power the Sikorsky. The 169 features a digital, three-screen glass-panel avionics system, a 222-cu-ft cabin and a 45-cu-ft baggage hold. AW plans to offer search-and-rescue, EMS, offshore and corporate variants. AW anticipates a market for 1,000 copies of the \$10- to \$12 million AW169 over the next 25 years.

AW609

The long-troubled partnership between AgustaWestland and Bell to develop a civil tiltrotor is officially over. After years of public discord, the companies announced a preliminary agreement in June 2011 for AW to assume the assets of the Bell Agusta Aerospace Co., the joint entity formed to develop the aircraft, pending regulatory approvals (issued last November). AW is forming a new U.S.-based entity to complete certification in 2015 or 2016. Development work will be based at AW in Cascina Costa, Italy, where two more prototypes will be constructed for the flight-test program.

The 609 program was announced in 1996 and the first prototype flew in 2003. Two test aircraft have flown more than



AgustaWestland AW609

600 hours at altitudes of up to 25,000 feet and speeds of up to 275 knots. AW maintains that 85 percent of the flight envelope testing is complete and that orders remain for 70 copies of the aircraft. However, many of those orders are price conditional and AW could not immediately provide additional details on the new unit price and the viability of those orders. When the 609 was announced it had a price tag of \$8 million; that is now believed to have soared to \$30 million.

Avic AC313

In 2010 China flew a "new" home-grown heavy-lift helicopter for the first time. The AC313 tips the scales at 27,600 pounds, can carry up to 27 people, has a maximum ferry range of 560 miles and was built at state-owned Avic, the same company that recently made Sikorsky S-76 airframes under contract.

The AC313 appears to be an outgrowth of the 14,000-pound Chinese Zhi-8. That medium helicopter is based on the 1970s-vintage Aerospatiale SA321 Super Frelon, a design that dates back to the early 1960s. However, the AC313 has been updated with modern avionics, a trio of Pratt & Whitney Canada PT6B-67A engines (1,200 shp each) and composite



Avic AC313

main rotor blades. Avic plans to pursue certification of the AC313 in export markets, including the U.S. *China Daily*, the state-run newspaper, hailed the new helicopter as a "breakthrough in domestic aviation technology." The AC313 received Chinese certification on January 4.

Deliveries of the AC313 are expected to begin this year.

Avicopter

AC311

In late 2010, Avicopter conducted the first flight of another helicopter, the AC311 light single, which closely resembles a Eurocopter AStar. Certification of the AC311 is expected later this year. Like the AC313, the AC311 relies on Western engine technology. The helicopter is powered by a single Honeywell LTS101-700D-2 turboshaft. Avicopter estimates a market for 500 AC311s over the next decade and plans to export it.



Avicopter AC311

AC352

The AC352 (formerly known as the Z-15) is the Chinese version of the "jointly developed" Eurocopter EC175. Certification is delayed to 2014. It is to be powered by Turbomeca/Avic Engine Dongan Arden 3C/WZ-16 turboshafts.

Bell

Bell 407GX

The 2012 407GX is priced at \$2.795 million, \$150,000 more than the 2011 Model 407. The GX is equipped with the Garmin G1000H integrated glass-panel avionics system. The GX's G1000H system can be configured to include HTaws, Tcas, synthetic vision and electronic maps,



Bell 407GX

ADS-B, high-speed data bus, global worldwide weather and connectivity and displays all electrical, engine and engine power parameters, all on a pair of 10.4-inch LCD displays. Optional kits include the Garmin GDL 69AH XM weather and radio; Garmin GDL 59H datalink and flight parameter recorder; Garmin GSR 56H Iridium voice/data transceiver; Garmin GTS 800 traffic advisory system (ADS-B IN), ELT, radar altimeter, automatic speech recognition and 3-D audio.

The G1000H system will be able to monitor system parameters that can be used as part of a FOQA (flight operational quality assurance) program.

The data is downloaded to a micro-SD card, from which it can easily be moved to a laptop computer. The FOQA program can include the monitoring of exceedances per the flight manual, and operators will be able to choose the information they want to download such as altitude, direction, speed and navigation parameters. The system also is designed for future growth, including the monitoring of dynamic components such as the main gearbox, drive shaft, bearings and engine. The G1000H's large displays can also display law-enforcement functions such as forward-looking infrared (FLIR) display and camera images. An onboard camera focused aft can be activated by a switch on the collective to let the pilots monitor the tail-rotor area for conflict.

407AH

The armed 407AH is equipped with a "baseline" law-enforcement package that can be customized for multiple weapon configurations and is designed to perform search-and-rescue, enforcement and pursuit. The 407AH is priced "under \$5 million" and equipped with



Bell 407AH

Garmin's G500H glass-cockpit system, AAI bulged skylights, inlet-barrier filter, wire-strike protection system and Meeker quick-release door pins. Weapons on the 407AH include a Dillon 7.62-mm M134T mini-gun and M260 2.75-inch seven-shot rocket launcher. Buyers can add options such as chafe/flare controller for countermeasures, sliding rear doors, cargo hook and crew seat armor. The 407AH, said Bell vice president Larry Roberts, "will meet the needs of a variety of parapublic agencies at a cost that is far less than that of similarly equipped military aircraft, but with increased lethality." The 407AH is being developed primarily for the export market. It will be available to qualified customers directly from Bell, as opposed to via contracts from the U.S. Defense or State Department.

Roberts said the AH was designed to be rapidly reconfigurable and that customers could take the guns off or put them back on. "This is a non-integrated system," he emphasized. "It does not fire directed munitions. By doing it this way it is really a commercially armed aircraft and we can offer it outside the scope of the military process. All the necessary licenses have been applied for or acquired."

Composite Helicopters

KC518 Adventourer

A New Zealand company plans to build an all-composite, six-seat turbine single for less than the price of a new Robinson R66. Composite Helicopters of Auckland brought the carbon fiber and Kevlar fuselage of its new KC518 Adventourer to EAA AirVenture Oshkosh last July. The helicopter will initially be offered as a \$335,000 kit (with a



KC518 Adventourer

\$44,500 fast-build option), but the company plans to offer a certified production model eventually for \$795,000. The helicopter features a four-blade aluminum main rotor and shrouded composite tail rotor. The kit excludes engine, avionics, battery, upholstery and paint.

Preliminary specifications are based on kit helicopters fitted with the Rolls-Royce RR250-C20B/J and call for the KC518 to be available in five- or six-seat configurations, have a cruise speed of 135 knots, an endurance of 3.6 hours (96-gallon tanks) and a useful load of 1,450 pounds. Composite main rotor blades are a contemplated option. With a full complement of passengers and baggage the endurance slips to 2.6 hours. Anticipated IGE and OGE hover ceilings are 10,000 and 8,000 feet, respectively, with a maximum altitude of 14,000 feet and a 1,000-fpm rate of climb.

Certified models will be equipped with either the RR300 or RR500, and cargo sling and spray system options will be available. The version with the RR300 will have a max takeoff weight of 2,850 pounds; the derated RR500-powered model will see that increased to 3,200 pounds and be dedicated primarily to users with high/hot requirements. As of January, the company had received orders for 41 helicopters.

Eurocopter

EC145T2

The Eurocopter EC145T2, a major upgrade of the EC145, is slated for FAA certification next year. In the middle of last fall, it completed "hot and high" testing. The manufacturer has thus seen "promising" performance. Eurocopter



Eurocopter EC145T2

said that the new EC145 version's engines, at 894 shp each, will deliver 21 percent more takeoff power. A 39-percent improvement is expected for one-engine-inoperative maximum continuous power (now at 770 shp). Turbomeca will also offer a "special 30-minute power rating for occasional use."

The EC145T2 uses Fadedec-controlled Turbomeca Arriel 2E turboshafts instead of the original Arriel 1E2s. The Fadedecs promise to simplify the starting phase. Initial engine TBO will be 4,000 hours; that number will increase to 6,000 hours "at maturity."

In addition, the EC145T2 features a fenestron shrouded tail rotor. In the cockpit, pilots will find Eurocopter's new Helionix avionics suite. A four-axis autopilot will be standard, an unusual feature on rotorcraft of this size.

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EC175

Eurocopter is in the final stages of its EASA certification effort for the EC175 medium twin. Demonstration flights, with customer pilots on board, have begun. Most of this year will be spent certifying equipment, with first delivery expected late this year.

In a move obviously targeted at the AgustaWestland AW189, Eurocopter announced early last month that it is



Eurocopter EC175

developing an 18-passenger configuration. Meanwhile, the helicopter has a radius of action of 135 nm (up from 90 nm) with 16 passengers. With the same number of passengers, the AW189 has a radius of action of 140 nm.

The EC175 features Pratt & Whitney Canada PT6C-67E turboshafts and an entirely new cockpit and man-machine interface, designed by Eurocopter. Cruise speed will be close to 140 knots. MtoW will be in the 15,000-pound class. The program is a 50-50 joint effort with China's Avicopter.

X3

Eurocopter is considering a third flight-test phase for its X³ ("x cube") compound demonstrator, considering the "very good outcomes" of the second phase. The third phase would "investigate further potential of the concept." The X³ reached 232 knots at 75- to 80-percent power last spring in



Eurocopter X3

phase two of its flight-test program.

The aircraft is a modified AS365 Dauphin with a conventional main rotor, two propellers on stub wings and a conventional empennage. While helicopters usually cruise at 140 to 150 knots, the X³ concept is aimed at proving that 220 knots is a sweet spot where speed is profitable. It was unveiled in September 2010 at the Istres military flight-test center in France, near the helicopter manufacturer's factory in Marignane.

During the flight-test campaign, the X³ demonstrated a rate of climb greater than 5,000 fpm. The crew flew pitch-up attitudes in the 30- to 50-degree range. Turns were performed at 80 degrees of bank angle.

The main gearbox is that of the EC175. The engines are the RTM322s of the NH90 military transport. At 2,300 shp each, they provide more power than the X³ needs.

This year, Eurocopter may decide to turn the demonstrator into a product. Hoped-for applications for this high-speed, long-range concept include search-and-rescue (with a rear door for the hoist), border patrol and commercial passenger transport. Eurocopter's first compound product may be in the EC225 category—19 passenger seats—mainly for oil and gas offshore operations, within six to eight years.

X4

Eurocopter is working on a replacement for its AS365/EC155 Dauphin medium twin and is targeting 2016 for entry into service of the first iteration, with a more advanced version to enter service in 2020. Codenamed X4, the helicopter will feature a radically new cockpit, fly-by-wire controls and low-noise main rotor blades. It will compete in the 9,000- to 12,000-pound category.

The first version, planned for 2016, will make use of technologies that have already been ground-tested. The second iteration, in 2020, will use technologies that are at the feasibility-study stage today. For example, fly-by-wire (FBW) controls will appear on the second version.

Sagem will design the FBW control system with sidesticks. The X4 will be the first Western civil helicopter in service with such controls. The expected benefits, for the pilot, are improved handling qualities and more precise flying. Passengers will benefit from the smoother ride of FBW.

The cockpit will look quite different from those of today, with the main flight-information display projected onto the windshield itself and the flight path shown in highway-in-the-sky style. In a more conventional head-down position, a central display will present navigation and power information. On the pedestal, between the two seats, what is likely to be a touch-screen displays the rest of the information. It is not clear yet whether this

advanced cockpit will be for the first or second X4 variant.

Turbomeca is working on the 1,100-shp-class TM800 engine to replace the current Arriel 2 turboshaft.



Eurocopter X4

Engine certification is planned for 2016. Turbomeca targets 20-percent cuts in specific fuel consumption and maintenance costs.

The main rotor blades appear to be an application of Eurocopter's Blue Edge concept. A double-swept shape reduces the noise generated by blade-vortex interactions.

EC130B4 upgrade

Eurocopter is expected to introduce an enhanced version of its EC130B4 light single, with improvements in comfort and performance, soon, according to two industry sources. The helicopter maker has put particular focus on the B4's cabin. New doors and air conditioning are said to offer lower interior sound levels, while passenger seats will now be easier to remove. Vibration levels will be reduced using a system inspired by a similar system in the larger Eurocopter EC225. The upgraded EC130's fuel tank has been designed to provide better crashworthiness. A Turbomeca Arriel 2D engine will give the helicopter better hot-and-high performance. Thanks to the additional power, the enhanced B4 will have better external-load capacity, thus giving it more versatility.

Kamov

Ka-226T

The Kamov Ka-226T light twin, a Turbomeca-powered version of the Russian coaxial-rotor helicopter, is now expected to receive certification next year, two years later than the estimate the



Kamov Ka-226T

company previously released.

Yet it seemed the development was making good progress. Last fall a Ka-226T participated in rescue training for the Winter Olympics that are to take place in 2014 in Sochi, Russia. The exercises were conducted under the auspices of Emercom, the Russian Ministry for emergency situations. They showed that the Ka-226T could land on a 210-sq-ft area near a highway and, from there, evacuate an injured person on a stretcher.

The Ka-226T has a service ceiling of 24,000 feet, according to the manufacturer. It seats eight, including the pilot, and has an mtoW of 7,900 pounds. It can operate at temperatures ranging from -50 degrees C to +50 degrees C, the manufacturer claims, and land on soft terrain. The EASA certified the Turbomeca Arrius 2G1 (730 shp for takeoff), the Ka-226 variant of the Arrius, in November.

Ka-62

Russian Helicopters and engine manufacturer Turbomeca signed contracts last year for the supply of "at least 308" Ardiden 3G turboshafts to be installed on the "updated" Kamov Ka-62 medium twin. A firm order for 40 engines (part



Kamov Ka-62

of the agreed 308) was signed soon after. The Ardiden 3G is a 1,700- to 2,000-shp variant of the Ardiden 3.

This announcement follows the "protocol of intentions" signed in February last year. In the intervening months, Kamov had considered some other engine suppliers—Pratt & Whitney Canada, Motor Sich and NPO Saturn.

This time, the firmed-up decision seems to have kick-started the protracted program. Certification is pegged for 2014. However, Russian Helicopters recently declined to give an update on the development.

The 14,300-pound-mtoW Ka-62 will feature a shrouded tail rotor and an anti-icing system. The airframe structure is 50-percent composite. In addition, the Fadec-controlled engines will provide "exceptionally low" fuel consumption.

The Ka-62 can accommodate 12 to 14 passengers in the cabin or 5,500 pounds on the hook. Cruise speed stands at 146 knots and range at 415 nm. Russian Helicopters intends to offer the helicopter for offshore oil operations, search-and-rescue missions and corporate transportation.



Marengo Skye SH-09

Skye SH-09

Marengo Swisshelicopter, a new entrant in the helicopter industry, is developing the Skye SH-09, a "high-performance" light single. The first prototype is being assembled near Zurich, Switzerland. The company aims to fly it by year-end.

Certification is slated for 2014. Marengo has not yet decided whether the FAA or EASA will be its primary certification authority.

The first prototype will be powered by a Honeywell HTS900 turboshaft. The designers are still talking to Turbomeca, Pratt & Whitney Canada and Rolls-Royce as potential alternative engine suppliers.

The manufacturer will offer two avionics suites. The first one, provided by Sagem, will be more sophisticated, providing a two- or three-axis autopilot.

The second one, the Garmin G1000, will be more affordable but still "very versatile." Moreover, it will be more compact, limiting its intrusion into the pilot's field of view.

In the 5,500-pound class, the SH09 will seat five to eight passengers. It will feature a shrouded tail rotor, a flat-floor cabin and clamshell doors. It targets a high-speed cruise of 145 knots. Maximum range, with standard fuel tanks, will be 430 nm. Its list price is \$3 million for delivery in 2015.

The company has received letters of intent for 10 helicopters, filling all the first year's production slots.

Mil

Mi-38

Two prototypes of the Mi-38 heavy twin participated in the flying display at the Maki airshow in Moscow in



Mil Mi-38

August—the only indication that development is continuing. One prototype, OP-1, was powered by a pair of Klimov TV7-117V engines (2,500 shp each). The other one, OP-2, was fitted with Pratt & Whitney Canada PW127/Ts engines of equivalent power.

The 34,400-pound-mtoW Mi-38 has seating capacity for 30. It features Tranzas IBKV-38 avionics. Operational range is specified as 480 nm. Service ceiling is said to be 16,700 feet. Maximum payload is estimated at 11,000 pounds (internal) or 15,400 pounds (sling load). Cruise speed is expected to be close to 150 knots.

The program was resumed in late 2010. Certification is scheduled for 2014. The aircraft will be pitched at civil markets such as aerial work, executive transportation and offshore operations.

Quest Helicopters

AVQ

A new entrant in the helicopter industry, Quest Helicopters is developing the AVQ, an innovative light twin designed mainly in the Ukraine and to be manufactured in the United Arab Emirates (UAE). The AVQ features two



Quest AVQ

counter-rotating rotors in tandem configuration and an ejection capsule for the occupants. First flight is pegged for early 2013.

The design bureau, led by Volodymyr Udvenko, also the designer of the Aerocopter AK1-3 helicopter kit, is located in Kharkov, Ukraine. The engines, Progress DB/Motor Sich A1-450M turboshafts of 465 shp each, are a new Ukrainian design. The controls will be fly-by-wire.

So far, Quest is designing a proof-of-concept aircraft and has not yet decided on the size of its first production model. Envisioned applications include VIP, police, EMS and utility.

A four-seat version would cost \$2.95 million. It would cruise at 160 knots and have a maximum endurance of 3.6 hours. MtoW would be 4,960 pounds.

The AVQ incorporates an ejection capsule that allows the pilot to jettison the cockpit and cabin from the aircraft in the event of "a catastrophic failure" (something considerably more serious than an engine shutdown). After separation, ejection thrusters would push the cabin forward and two parachutes would deploy. Its developers anticipate that the capsule can be safely jettisoned from as low as 300 feet.

Sikorsky

S-434

Sikorsky has not disclosed any details of the S-434 flight-test program, but it has said that it anticipates FAA certification of the single early this year. An improved Schweizer S-333, the S-434 sports a four-blade rotor, a new tail-rotor



Sikorsky S-434

blade design, a structurally enhanced landing gear, a new trim system and an improved Kaflex driveshaft. The main rotor and its transmission come from the unmanned Fire Scout.

The S-434 and the S-333 use the same Rolls-Royce 250-C20W turboshaft, which provides 320 shp. The new main rotor allows for a 300-pound increase in mtoW, to a maximum 2,850 pounds. This translates into a useful load of "more than 1,400 pounds." The new tail rotor can generate some 20 percent more thrust than the tail rotor on an S-333, improving handling and controllability, despite the increased weight, according to Sikorsky. Sikorsky has not yet decided whether it will continue to produce the S-333 once the S-434 enters production.

S-76D

Sikorsky has once again delayed its S-76D program, now foreseeing FAA certification in the second quarter of this year. Three prototypes have flown a total of 680 hours. Still to be performed are tests such as lightning, fire suppression, cold weather, high altitude and rotor ice protection. The last three items will not be part of the basic approval but certified later.

Two more prototypes are to join the program early this year. The S-76D program has encountered repeated delays (in 2009, certification was still planned for 2010); the company has not been specific about the root causes of the delays.

Recent progress includes Canadian and U.S. certification of the Pratt & Whitney Canada PW210S engine, two of which power the S-76D. The 1,077-shp (takeoff rating) PW210S is a



Sikorsky S-76D

derivative of the PW600 turbofan. It offers 8 percent better fuel efficiency over its predecessor, according to the manufacturer.

Thales has been tapped to install its Top Deck avionics suite in the cockpit of the medium twin. It is designed to be "interactive, intuitive, integrated and safe," under Thales's "iCubeS" concept. Top Deck is based on four 6- by 8-inch displays and two cursor control devices. Depending on the flight phase and aircraft environment, the displays reconfigure automatically to supply "the most relevant information." Two displays are for primary and navigation information, while another two are multifunction, providing digital map, engine parameters, maintenance data and so on.

The 11,700-pound S-76D has a range (without reserves) of 442 nm.

X2

Sikorsky's X2 technology demonstrator, a high-speed semi-compound helicopter, flew for the last time in July at the company's West Palm Beach, Fla. test center. The sortie took place without the central hub fairing (also known as "aero sail"). Sikorsky engineers are now transitioning to the design of the S-97 Raider prototypes, which will also feature contra-rotating main rotors and a pusher propeller.

The July flight was the 23rd test flight of the X2, which flew approximately 22 hours in total. On Sept. 15, 2010, it achieved a maximum cruise speed of 253 knots in level flight, setting an unofficial speed record for a helicopter.

The S-97 Raider helicopter program is the follow-on program to the X2 technology demonstrator initiative. Sikorsky research and engineering v-p Mark Miller said the program will enable the U.S. military "to evaluate the viability of a fast and maneuverable next-generation rotorcraft." The program will produce two prototype attack aircraft with six-passenger cabins and the ability to carry armament. The target cruise speed is 220 knots. □



Sikorsky X2