



Aviation International News®

Respected. Requested. Required.



- PUBLICATIONS**
- FEATURES**
- DEPARTMENTS**
- NEWS**
- SERVICES**
- EDITORIAL**
- ADVERTISING**
- SUBSCRIBE**
- SITE MAP**

JULY 2006

Bell/Urban Aeronautics unveil vertical lift X-Hawk

By Stephen Pope / Farnborough International Air Show July 2006

Bell Helicopter of Fort Worth, Texas, and Urban Aeronautics based near Israel's Ben Gurion Airport will unveil today the X-Hawk, an innovative vertical-lift aircraft that could create a new class of civil and military powered-lift vehicles. A full-scale mock-up of the twin-turboshaft X-Hawk is on display in Bell Helicopter's aircraft covered aircraft static display (No. OE1, next to the Bell and Bell Boeing chalets).

Configured for military or paramilitary roles in an urban environment, the mockup shows a configuration that could carry 11 combat troops and one pilot or be outfitted for EMS operations without the armament. The cabin, located between the two horizontal rotors, is about the same size as that of a Bell 212. Target mtow is 6,700 pounds. Endurance with maximum fuel of 1,300 pounds would be about two hours with reserve, maximum range would be 330 nm and operating radius would be 140 nm. Wind-tunnel tests of an X-Hawk scale model last year confirmed a max speed as high as 140 knots. The price target for an EMS-configured X-Hawk is in the realm of helicopters of "comparable capability," such as an EC 145, which now costs about \$6 million.

Dr. Rafi Yoeli, president and CEO of Urban Aeronautics, designed the X-Hawk over the last five years, after selling Aero Design and Development, a research and development company he founded 15 years ago, to Haifa-based Elbit. Before that he worked as an aerospace engineer for Israel Aircraft Industries in Tel Aviv.

In 2003, Yoeli flew the small, two-person CityHawk he had designed and built in a hover on a number of flights. Though underpowered (by its eight, two-stroke piston engines), the aircraft was successful enough to prove the concept and start Urban Aero on development of the X-Hawk. Last July Yoeli introduced the X-Hawk to Bell and in August the two companies signed a memorandum of understanding to cooperate on development of the project.

Urban Aeronautics has begun to build a full-scale demonstrator on its own, and is seeking an additional \$10 million in funding to complete the aircraft. Yoeli said he already has two Honeywell LTS101 engines for the demonstrator, though he envisions production X-Hawk's being powered by the more powerful LHTEC CTS800 or MTR390 turboshaft engines.



Inside AIN

Bolen hawks grassroots initiative

NBAA's CEO encourages attendees at D.C. regional forum to get involved in user-fee debate.

Another obstacle for ADS-B

On the heels of the national launch, industry questions the system's vulnerability to attack.

The future of ATC Government

Accountability Office urges JDPO to create roadmap to meet ATC challenges.

Vision 1 certified in Challenger

STC clears the way for Universal to bring SVS to business airplanes, beginning with the Challenger.

AirCell plans nationwide Wi-Fi

network

Frequency spectrum license clears the way for construction of 200 broadband stations.

Will the air limo industry take off?

Industry's who's who gather to discuss the emerging air limo marketplace.

A look at the fractional market

Fractional services are constantly evolving to balance service, value and profitability.

More stringent MU-2 training likely

Operators discuss need for more rigorous training at the Prop seminar.

North Sea fleet expansion

Increasing demand from oil industry drives operators to expand their fleets.

Proposed visiting pilot rules challenged

Citing safety concerns, industry groups take issue with proposed changes to visitor program.

Lawsuit raises copyright concerns

Gulfstream asks judge to reconsider allowing Camp to use the OEM's maintenance manuals.

ATC funding divides RAA members

Reluctant to anger the mainline airlines, RAA looks for common ground on funding issue.

T-props grab top billing at RAA

Rejuvenated turboprop market shows few signs of slowing down.

New landing distance rules

FAA rule requires commercial operators to

Yoeli said he hopes to "field the X-Hawk within 10 years, 15 at most," and that Urban Aeronautics would proceed with the project even without Bell's participation. The third member of the team, Penn State University in State College, Pennsylvania, has received funding from the U.S. Office of Naval Research to help develop fancraft technology. More funding from ONR is pending.

What excites Bell about the X-Hawk's fancraft technology, according to Jon Tatro, director of advanced concept development, are two patented technologies that propel the X-Hawk beyond the confines of the experimental "flying cars" it so much resembles. (Indeed, Yoeli used Frank Piasecki's 1950s "Aerial Jeep" as the starting point for the design.) The first technology is the added variable inlet vanes placed above each of the counter-rotating fore and aft shrouded rotors, which work in concert with the vanes placed below the rotors. (Older such vehicles had vanes only below.) The second is the variable inlet louvers in the front of the forward rotor's shroud and in the rear of the aft rotor's shroud. These are opened automatically to reduce drag over the top of the shroud in forward flight, greatly increasing the X-Hawk's forward speed potential.

The vanes, louvers, variable pitch rotors and two reversible thrusters (mounted on the tail and driven by shafts from the turbine engines) provide flight control via a fly-by-wire or fly-by-light control system. The 8.2-foot-diameter rotors rotate at a constant speed of some 1800 rpm, reduced from 6000 rpm at the engine outputs. Each engine includes a free-wheeling gear so that a landing can be safely made after engine failure. Because the rotors are essentially horizontal propellers (or "sideways Firestorms," as Tatro put it), anti-icing is relatively simple.

Tatro said Bell Helicopter and Urban Aeronautics have established a phased approach to development of the X-Hawk. Bell has already begun the first phase of technology assessment and market analysis. From Bell's viewpoint, the X-Hawk could bring the vertical-lift component back into the combat urban environment. The U.S. experience in Somalia in 1993, as dramatically portrayed in the movie "Blackhawk Down," has forced military commanders to limit the use of helicopters in urban areas, where they are susceptible to hostile fire and numerous ground obstacles. This has forced the military to rely more on ground vehicles, with their vulnerability to "improvised explosive devices," road blocks and ground attacks.

The X-Hawk has the promise of quick, almost stealthy reaction and below nap-of-the-earth flight in urban areas. The shrouded rotor design permits operation right up to the side of buildings. Indeed, Bell believes the aircraft could be used to accomplish "midlevel structure infill," loading and offloading people in a hover through windows above the ground floor. Sliding doors on both sides of the fuselage make this possible.

The X-Hawk's major disadvantage compared with a helicopter is its fuel consumption. "It's a gas guzzler," admitted Yoeli freely. "It will never be as fuel-efficient as a helicopter, but neither is a helicopter as efficient as a tiltrotor or a tiltrotor as efficient as a turboprop. But it can fill a short-range niche in an obstacle-rich urban environment. In years to come it could happen that only X-Hawk-type vehicles will operate in high-density urban areas."

allow a 15-percent landing safety margin.



Urban Aero is leading the design activities during phase one, while Bell performs systems integration and production work. In phase two, Bell XworX will build an X-Hawk demonstrator. Though Bell is not fully committed to the X-Hawk yet, Tatro said the two companies have already discussed—and basically agreed upon—revenue sharing should the aircraft go into production. ■

Aviation International News is a publication of The Convention News Co., Inc., P.O. Box 277, Midland Park, NJ, 07432. Copyright 2006. All rights reserved. Reproduction in whole or in part without permission from The Convention News Co., Inc., is strictly prohibited. The Convention News Co., Inc., also publishes Business Jet Traveler, NBAA Convention News, HAI Convention News, EBACE Convention News, Farnborough 2006, Dubai 2007, Paris 2007, Asian Aerospace 2008, and AINalerts.
