Raytheon Aircraft turned a few heads at the NBAA’s Orlando convention when Brad Hatt, president and general manager of the Hawker unit, announced that the $13.8 million Hawker 850XP, the newest iteration of the Hawker 800 family, would be fitted with winglets designed by Raytheon’s own engineers. Up until then, it appeared to be a foregone conclusion that Aviation Partners’ full-chord, 44-inch-tall winglets recently certified for the Hawker 800 would have been standard.

The Raytheon-designed winglets are about two-thirds the height of the API winglets and they occupy the rear two-thirds of the chord section at the wingtips. They feature a super-critical airfoil having a higher critical Mach number than the basic wing. This results in virtually no shock wave formation on them at high-speed cruise. The winglets provide 100 nm more range, which is about 4 percent better specific range. They do this by helping to neutralize the wingtip vortex, thereby reducing induced drag. They also improve climb rate by 8 percent and hold promise for better takeoff field performance, although runway numbers won’t be recertified until after the Hawker 850XP deliveries begin in the first quarter of this year.

Raytheon’s homegrown winglets add 100 nm more range to the design’s latest progeny.

By Fred George
The considerably larger API winglets, in contrast, improve range by 7 percent or about 180 nm, according to Aviation Partners CEO and founder Joe Clark. But Raytheon Aircraft’s folks couldn’t come to acceptable terms with API regarding the licensing agreement, so they elected to engineer their own winglets. Another reason was Raytheon’s intent to double the 300-hour basic maintenance inspection intervals to 600 hours. The design of the homegrown winglets allows 600-hour inspection intervals. This lowers direct operating costs for owners.

But there’s still an uncanny resemblance to the API winglets, according to Clark. “It appears that they went to school on us.” Raytheon had installed a set of API winglets on a Hawker 800XP early in 2005 for evaluation purposes, so the firm’s engineers had plenty of time to study the API design, Clark said. “It looks like there may be some legal issues involved here, but we haven’t had time to fully evaluate the situation.”

Hatt scoffed at the implication that Raytheon’s winglets are scaled-down versions of API’s. He noted that Raytheon Aircraft has developed winglets for other models in the past, including the Super King Air 350, so its engineers are familiar with winglet design. The 850XP winglets were designed using Raytheon’s own CFD codes, he said, and they had been undergoing flight tests for several weeks before the announcement was made at NBAA in November 2005.

Similar to the API winglets, the Raytheon winglets are built from strong, lightweight composites. They increase wingspan by 3.5 feet, are fitted with long-life LED position lights and abrasion-resistant metal leading edges. In addition to stretching specific range, the winglets should enhance high-altitude, high-speed performance, helping to delay the onset of turbulence-induced, Mach-effect aileron buzz.

An additional 100 nm of range may seem like a modest increase, but Hatt claims it can make a big difference when flying against a headwind. Flying with six passengers from Teterboro to Van Nuys, Calif., for instance,
the 850XP will be able to buck 93-percent probability headwinds. Lacking winglets, the 800XP only can make the trip against 85-percent headwinds. Departing Teterboro for San Francisco, the 850XP can complete the trip against 80-percent probability headwinds, compared to 58-percent probability winds for the 800XP.

The Hawker 850 carries over many of the proven systems of the Hawker 800XPi, including its four-screen Rockwell Collins Pro Line 21 with engine instruments electronically displayed on the pilot’s MFD, an IFIS file server and Airshow 21 cabin management system. The file server supports an optional e-chart function, along with enhanced map graphics and 3-D FMS route display. XM WX Satellite Weather or Universal Weather data-linked weather graphics are optional, but the Universal package requires a third VHF comm radio. The FMS CDUs have a radio tuning function, so there's no need for stand-alone radio tuning units.

The 800 series aircraft have one of the most comfortable cabin cross-sections in the midsize class, making it a perennial first-place finisher in the sales race. The new aircraft has a redesigned interior with better space utilization. It features a four-seat forward club section and an aft section with the two-place divan on the left side across from a single, forward facing chair on the right. This arrangement allows a large luggage storage closet to be fitted to the front section of the cabin, directly across from the entry door. There are LED direct and indirect lights throughout the cabin, eliminating all of the hot incandescent bulbs and trouble-prone fluorescent tubes. The LED lights, coupled with the Airshow 21 cabin management system, should increase dispatch reliability significantly.

The quality of the cabin completion is noteworthy. Raytheon’s Little Rock, Ark., completion center is one of the best in the industry. No manufacturer offers better high-gloss, wood-veneered cabinetry. The leather upholstery on the cabin chairs is excellent and the fit-and-finish of all components earns top marks.

Flying the 850XP — Except for the Winglets

Strap into the left seat of a Hawker 800XPi and you’ll find out what it’s going to be like in the front office of the Hawker 850. Early last November, we flew one from San Diego-Gillespie Airport to Beech Field in Wichita. The new Pro Line 21 cockpit represents a large leap forward in technology compared to the Rockwell Collins Pro Line 4 and Honeywell SPZ-800 systems installed in earlier 800 series airplanes.

The layout of the instrument panel and console is much cleaner than in previous
Raytheon’s homegrown winglets add about 4 percent or 100-nm range. In addition, their design is consistent with the Hawker 850’s extended 600-hour scheduled maintenance intervals.