

# Premier Finally Earns an 'A'



By Fred George

The Premier IA features much improved brakes, more capable avionics and better form-fit-functionality.

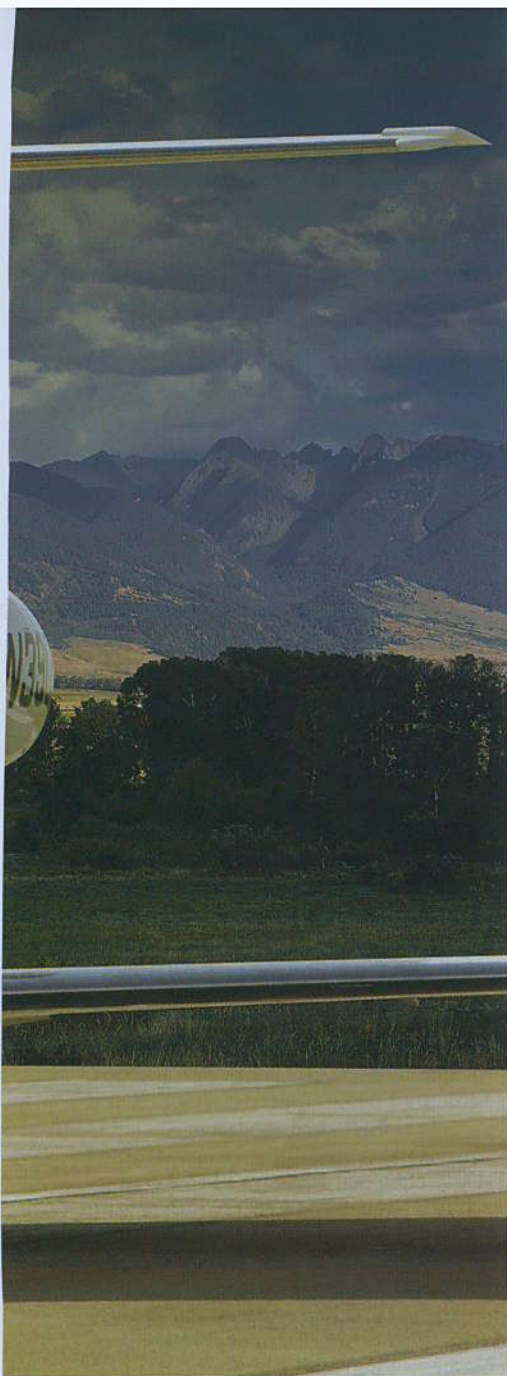
**F**ive years ago, Raytheon hailed its new Premier I as the fastest, largest single-pilot business jet on the market. While that was and remains true today, the company's lightest jet was still very much a work in progress. The braking action was inconsistent at best. The baseline Rockwell Collins Pro Line 21 avionics package had plenty of unrealized capabilities. The biomorphic-inspired interior design was *très outré* by business aircraft industry standards and it squandered available cabin space. The fuselage's carbon fiber plies, so carefully pasted in place by the Viper robot

at the factory in Wichita, showed through the exterior paint like basket weave under a wet sheet. Those shortcomings, among others, prevented the Premier I from becoming the runaway best seller its designers had hoped for.

Now hail the Beechcraft Premier IA, successor to Raytheon's Premier I, starting at s.n. 135 as a block-point model change that first rolled off the assembly line in October 2005. Still the fastest, largest single-pilot (the key characteristic to all Raytheon aircraft now bearing the Beechcraft label) business jet available, it eliminates virtually all the aforementioned shortcomings and boasts dozens of other detail improvements. The qualifier "virtually" refers to the hydro-mechanical power brake upgrade. That key difference became standard at s.n. 160 and

Photography Courtesy of Raytheon





it's available as a no-cost retrofit for s.n. 135 to 159 Premier IA aircraft.

Once a Premier IA was available with the new brakes, we jumped on the first opportunity to fly it and report back to you, our readers. It didn't take long to determine that the Premier IA is a far different aircraft from its predecessor.

#### Fit and Finish

From a distance, the Premier IA and Premier I look identical. However, once close up you immediately see an improvement in fuselage paint quality. Company officials explained that now an aviation-grade filler-primer is applied to the carbon fiber fuselage outer skin and then sanded to a smooth finish before the top coat is applied. The result is a surface that

resembles fiberglass gel coat, with the underlying carbon fiber plies virtually invisible. Surprisingly, the total labor hours required to finish a Premier IA has actually been reduced due to better process control.

All of the useful features offered by the original model have been carried over on the Premier IA. There is a 10-cubic-foot, 100-pound capacity, external baggage compartment in the nose that is ideal for storing crew baggage, engine duct and pitot/static tube covers and loose equipment. The 44-cubic-foot, 450-pound capacity aft external baggage compartment has plenty of room for bulky luggage, skis or bags of golf clubs.

Each navigation light fixture has dual incandescent bulbs for redundancy. This minimizes the chance a mission will be delayed because of a burned-out bulb. Raytheon eventually plans to upgrade to long-life LED nav lights, but no date for that has been set.

Once you step aboard, the Premier IA's changes become more obvious. The new model looks like a conventional, well-appointed business jet. With it, form follows rather than determines function. The Premier IA's rounded headliner panels, with their moon-shaped floodlights have been replaced by considerably thinner overhead sections that blend nicely with the center panel. Seated headroom has been increased by about one inch. Long-life LED floods provide indirect lighting along the edges of the outer overhead panels. LEDs instead of incandescent bulbs are used for reading lights. The sidewall panels also have been modernized. These now are front-to-rear single-piece units, making the cabin look longer and wider. The upholstery on the passenger chairs has been retailored for added comfort. The worktables are opened and closed with single-action movement and they are sturdier. In addition, the worktable enclosures and sidewall armrests have been recontoured for improved ergonomics and increased knee room. And finally, the lav seat now is cushioned for greater comfort.

The Premier IA's fully enclosed aft lavatory is one of the largest and most comfortable in the light jet class. The redesigned pocket doors are very solid and they completely shut off the lavatory when closed. The lavatory is equipped with a flushing toilet, but it's internally serviced.

The cabin is configured with six seats, four in club configuration, with two more forward-facing chairs aft. Plan on using the aft chairs only occasionally. They're fixed in place and legroom is limited, unless the rearmost chairs in the club section are tracked forward. However, then legroom in the club section becomes tight.

As shown in the accompanying interior photo, high-gloss wood trim for the sidewall armrests now is an option. High-gloss wood veneer finish on the forward cabinets and aft cabin-to-lavatory divider also is optional. Both options were installed on the aircraft we flew for this report and they add a midsize jet aura of quality to Raytheon's entry-level jet. Various optional metal finishes are available for latches, knobs and handles.

Three different forward, right-side optional refreshment center cabinets are available. One provides additional carry-on luggage storage, a second maximizes food and beverage storage and has an audio entertainment console, and the third has an audiovisual entertainment console with slide-out flat-panel display plus food and beverage storage. A Rockwell Collins Airshow 410 also is available, providing real-time text and graphic flight information. With such comprehensive audiovisual entertainment equipment available, we believe passengers would appreciate an optional XM satellite weather and XM audio entertainment capability in the cabin, as well.

The "executive option package" priced at \$14,650 and weighing about 15 pounds, adds leather worktable surfaces, inner Lexan panes to fully enclose the window shades, a second, right-side wing leading edge ice detection light and a 77-cubic-foot oxygen bottle in lieu of the standard 40-cubic-foot bottle, plus remote entry light switch and aft equipment bay lighting.

Premier IA interior sound levels have been reduced by an average of 2 dB through the use of improved insulation. That might not seem like a large-scale reduction, but it's quite apparent once the engines start.

#### Major Cockpit Upgrades

The Premier IA's standard equipment list up front includes several items that were optional or not even available aboard the Premier I. The Rockwell Collins Pro Line 21 system now features standard three-screen EFIS, second-generation all-digital Pro Line 21 CNS radios with a digital audio system that virtually eliminates hiss, static and interference from o-board systems. Other baseline equipment includes Collins FMS-3000 with 3-D non-precision approach guidance capabilities, solid-state WXR-800 weather radar and cursor control device. Honeywell Enhanced GPWS is standard, along with a single Collins ADF and DME radios. Notably, the Collins FMS-3000 now has a comm/nav frequency look-up function by airport and navaid, enabling the crew to copy and paste the appropriate frequencies into the radio control page on the CDU.



Standard equipment also includes an Integrated Flight Information System file server, provisioning the aircraft with the hardware to accommodate optional electronic Jeppesen charts and XM satellite or Universal Weather graphics. Both the e-charts and XM satellite weather are geographically referenced so that the crew can see the aircraft's position in relation to published waypoints and weather threats. The file server, XM satellite receiver and enhanced map graphics are available as a \$129,600 STC package for operators of RB-101 to RB-134 Premier I aircraft, assuming they originally ordered the three-display option.

We've now flown extensively with XM satellite weather and it's clear that this is one of the most significant safety breakthroughs since the invention of the onboard weather radar. The ability to look at NEXRAD imagery in real-time anywhere in the continental United States virtually takes the worry out of making strategic flight planning decisions while still hundreds of miles from any potentially dangerous weather conditions that could impact your flight.

The e-chart option also reduces stress in the cockpit, especially for single-pilot operations. Runway incursions are much less likely to occur if you can see your aircraft's position on an electronic airport diagram chart.



The 44-cubic-foot, 450-pound capacity aft external baggage compartment has plenty of room for bulky luggage, skis or bags of golf clubs.

Other options include a second FMS-3000 with GPS sensor (\$98,100), second DME (\$13,730), second ADF (\$11,020), Collins HF-9000 for over-water operations (\$68,380), dual extended squitter Mode S transponders for European operations (\$29,320) and TCAS 4000 TCAS II (\$145,350), plus an AirCell Iridium satcom (\$42,130). Loading up the aircraft with all avionics options adds about 120 pounds to BOW.

Most of these options were installed in the aircraft we flew for this report, increasing its single-pilot BOW to about 8,700 pounds.

## Flying the Premier IA

Veteran Premier I/IA demonstration pilot Trevor Blackmer again accompanied us on this demo flight out of Wichita, as he did when we first evaluated the aircraft for our October 2001 report. Joe Grubiak, Premier IA product manager, accompanied us during the flight.

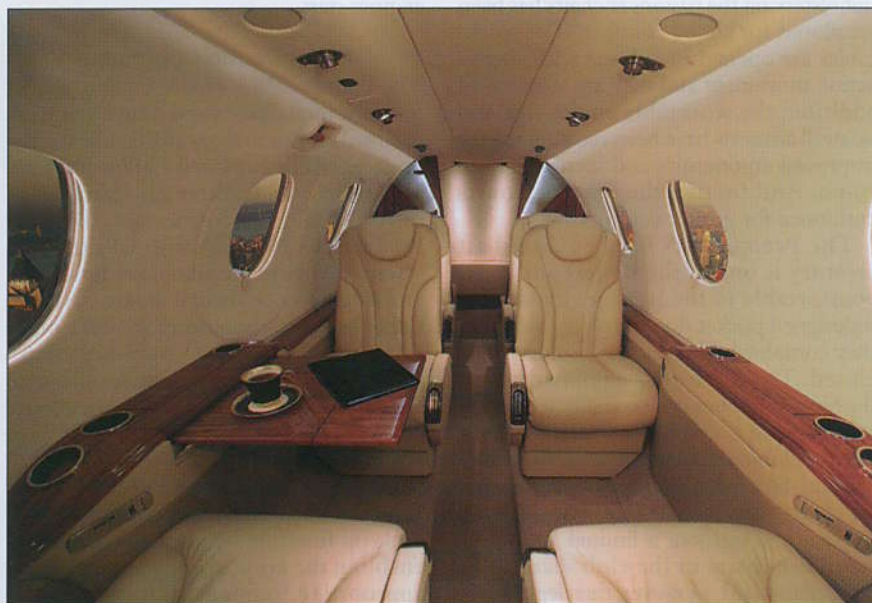
Other than the wheel brakes, aircraft structures and systems are virtually unchanged from the Premier I. The fuselage has two main structures, comprised of a cylindrical cross section pressure vessel and an aft tail-cone assembly. Both structures are carbon fiber/honeycomb/carbon fiber sandwich designs, featuring computer placement of the carbon fiber plies but hand lay-up of the honeycomb sections.

The wing is a conventional three-spar design. Raytheon developed a new, relatively highly loaded, low-drag airfoil for the Premier I, featuring 20 degrees of leading edge sweep and 75-percent span trailing edge flaps to enhance low-speed performance. Roll control is provided by manually controlled ailerons, augmented by computer-controlled and hydraulically actuated spoilers.

Two 2,300-pound-thrust, single-channel DEEC-equipped Williams FJ44-2 engines provide thrust for the 12,500-pound MTOW aircraft.

The wheel brakes have been thoroughly updated. While the Premier IA retains its predecessor's rolling stock and brake heat packs, most other components have been changed. The rudder brake pedals now have hydraulic master cylinders that port servo pressure to the main brake control valve. This eliminates the slop and hysteresis associated with the mechanical linkages used to connect the brake pedals to the brake control unit.

The power brake control valve ports high-pressure hydraulic fluid to the wheel brake cylinders in proportion to input pressure, but are computer modulated to prevent skidding. We found the wheel brakes to be much improved compared to the original system, providing very consistent and proportionate feel. However, there is some brake chatter when the heat packs are cold. When leaving the chocks after engine start, it's tough to avoid this while you're taxiing out to the runway. After landing, though, the brakes are warm and they work quite smoothly as you taxi back to the ramp.



High-gloss wood veneer finish on the forward cabinets and aft cabin-to-lavatory divider is optional.



The hydromechanical brake will be made available as an STC to Premier I operators, but Raytheon has yet to fix a price and date of availability.

The pre-start, post-start and taxi checks remain unchanged on the Premier IA. The pre-start fuel system, trim and fire protection checks are reminiscent of those in legacy Learjets. Post-start checks include special pressurization and spoileron calibration checks that aren't common to most light jets, in addition to the usual stall warning, rudder boost, engine anti-ice and manual fuel control checks. But interior sound levels have changed noticeably. A better door seal and upgraded insulation make quite a significant reduction in apparent cockpit and cabin sound levels once the engines are turning.

The Premier IA's FMS doesn't yet have a tabular performance look-up capability, so plan on using the checklist or AFM to compute takeoff field length and V speeds. Setting the V speed bugs is quite intuitive. We also set initial course, altitude, heading and pitch targets during the pre-takeoff brief.

We found the aircraft's optional electronic Jeppesen chart package quite useful from the time we first started planning our taxi



The avionics package greatly improves situational awareness and lowers pilot workload.

route from the Raytheon Aircraft delivery center to the threshold of Beech Field's Runway 18. The aircraft's GPS position was depicted on the geo-referenced chart so that we easily could plot the taxi route as directed by ground control.

The e-charts function is tied to the flight

plan programmed into the FMS. For example, if we had programmed in a published departure procedure, the appropriate chart would have been nominated and available for display using the cursor control device.

After departure, we climbed to FL 380

## Raytheon Premier IA

**Price as Equipped** .....\$6,168,940

### Characteristics

Seating ..... 1+6  
Wing Loading ..... 50.6  
Power Loading ..... 2.72  
Noise (EPNdB) ..... 78.3/87.9/92.0

### Dimensions (ft/m)

External ..... See Three-View  
Internal  
Length ..... 11.2/3.4  
Height ..... 5.4/1.6  
Width (maximum) ..... 5.5/1.7

### Power

Engines ..... 2 Wms Int'l. FJ44-2A  
Output (lb) ..... 2,300 ea.  
Flat Rating OAT°C ..... ISA+13°C  
Inspection Interval (hr) ..... 3,500

### Weights (lb/kg)

Max Ramp ..... 12,590/5,711  
Max Takeoff ..... 12,500/5,670  
Max Landing ..... 11,600/5,262  
Zero Fuel ..... 10,000/4,536  
BOW ..... 8,511/3,861  
Max Payload ..... 1,489/675  
Useful Load ..... 4,079/1,850

Executive Payload ..... 1,200/544  
Max Fuel ..... 3,670/1,665  
Payload With Max Fuel ..... 409/186  
Fuel With Max Payload ..... 2,590/1,175  
Fuel With Executive Payload ..... 2,879/1,306

### Limits

Mmo ..... 0.800  
FL/Vmo ..... FL 280/320  
PSI ..... 8.4

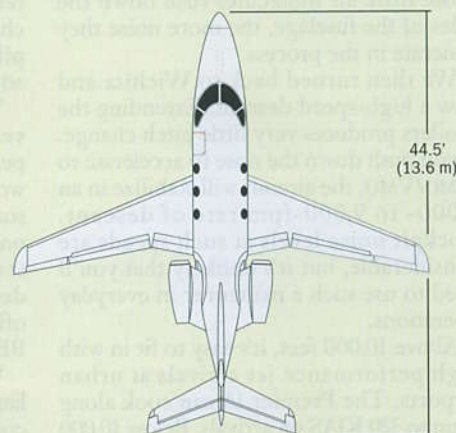
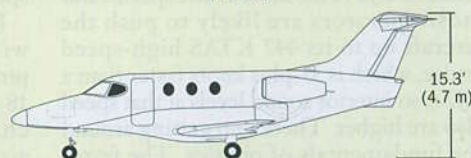
### Climb

Time to FL 370 ..... 17 min.  
FAR 25 OEI Rate (fpm/mpm) ..... 586/179  
FAR 25 OEI Gradient (ft/nm, m/km) .. 298/49

### Ceilings (ft/m)

Certificated ..... 41,000/12,497  
All-Engine Service ..... 41,000/12,497  
Engine-Out Service ..... 28,000/8,534  
Sea Level Cabin ..... 21,400/6,523

**Certification** ....FAR Part 23 A 52, 2001/05  
EASA CS-23, 2006







and accelerated to 0.78 Mach cruise. Several times during the climb and then in level cruise, we removed our active noise attenuating headset to check sound levels. The reduction in cabin noise seems much greater than 2 dB. Raytheon claims that the Premier IA is quieter than the Cessna Citation CJ2 at the same cruise speeds. But most operators are likely to push the aircraft up to its 447 KTAS high-speed cruise, which is 35-plus knots faster than a CJ2+, so interior sound levels at that speed also are higher. There's no getting around the fundamentals of physics. The faster those little air molecules rush down the sides of the fuselage, the more noise they generate in the process.

We then turned back to Wichita and flew a high-speed descent. Extending the spoilers produces very little pitch change. If you push down the nose to accelerate to MMO/VMO, the aircraft will stabilize in an 8,000- to 9,000-fpm rate of descent. Cockpit noise levels at such speeds are considerable, but it's unlikely that you'll need to use such a maneuver in everyday operations.

Above 10,000 feet, it's easy to fit in with high performance jet arrivals at urban airports. The Premier IA can cook along at up to 320 KIAS on arrivals. Below 10,000 feet, it's easy to exceed 250 KIAS because

the airframe is slippery. The aircraft is a delight to hand fly. It's stable, light on the controls and well harmonized. The pitch trim isn't overly sensitive, although it's nicely responsive. The Williams FJ44-2A engines have very linear thrust response to throttle movement, so it's easy to control speed.

How pleasant it is not to have to struggle with a chart book on approach. We programmed the FMS for the RNAV GPS 18 approach and recalled the associated e-chart on the middle screen. A small airplane symbol showed our position relative to the approach waypoints. The e-chart package perhaps is the best single-pilot workload reduction tool since the advent of the autopilot, in our opinion.

We then made a series of landings, the second of which was a full-stop performance maneuver. The new brakes work as advertised, although there's still some skip-and-release braking action. No one will confuse this brake system for a state-of-the-art brake-by-wire (BBW) design. But no light jet manufacturer offers an aircraft in this price range with a BBW system.

We departed once more and left the landing gear down in a wide left pattern to cool the brakes. They were still a little warm during our last landing at Beech

Field. Braking action on landing and taxi back to the delivery center was very smooth and progressive.

#### Qualitative vs. Quantitative Improvements

The Premier IA doubtlessly is a better aircraft than the Premier I. The interior now is unsurpassed for function and comfort in the light jet class. Sound levels are noticeably lower. The avionics package greatly improves situational awareness and it lowers pilot workload. And the wheel brakes' consistent performance now inspires confidence when landing on short strips.

Ultimately, though, the Premier IA still faces stiff competition in the light jet class because its two main shortcomings are runway performance and a full tanks payload of just 409 pounds. Moreover, the Premier IA's maximum FL 410 cruise altitude limits its range and exposes it to more weather than light jets that fly higher.

On bread-and-butter 2.5-hour missions, though, the Premier IA's cabin comfort for four passengers is head-and-shoulders above the competition in this price range. If you want a bigger cabin cross-section, plan on spending \$11 million for a midsize jet, because nothing in the light jet or super light jet class comes close. **B&CA**