The biggest King Air

King Airs soldier on, with the 350 leading the way

BY THOMAS A. HORNE

It's become fashionable to dismiss Raytheon's Beechcraft King Airs as antiquated relics from the 1960s, designs passed up by technology and the stampede to put out more and more light business jets. But sales numbers prove that there's plenty of life left in these hardworking, reliable turboprop twins. In 2001, Raytheon Aircraft Company reported it sold 119 King Airs. This includes the smallest King Air, the C90B (41 sales), the larger and faster B200 (46 sales), and the flagship of the turboprop fleet, the 350 (32 sales). These numbers represent almost one-third of Raytheon's total aircraft sales.

Of all the King Air models, the 350 takes the prize as the hardest of the hard-working—an adjective freely used to describe all King Airs. Why? There's an impressive fact about the 350. It can do what few piston single, piston twin, single- or multiengine turboprops, or light jets can: You can top off the 539-gallon fuel tanks, fill up all 11 seats, and still be within weight and center-of-gravity limits. This means that you can fly nearly 1,000 nm with seats full. In other words, there's no trade-off between payload and fuel. You just fill a 350 and go. To match this kind of long-range load hauling you'd have to move up the corporate aviation food chain to a mid-size (or larger) business jet.

PHOTOGRAPHY BY MIKE FIZER

As you might expect, the 350 is a beefy, powerful machine. It's heavy, too, with a 15,000-pound maximum takeoff weight. All that load hauling comes courtesy of: two 1,050-shaft-horsepower Pratt & Whitney PT-6A-60A engines; a sturdy construction that gives the airplane a 9,640-pound basic operating weight (empty weight plus one 200-pound crewmember)—some 1,000 pounds more than the B200's and 2,500 pounds more than the C90B's; and a maximum zero-fuel weight (12,500 pounds) that's as much as the B200's takeoff weight.

Let's say you load 10 passengers and 600 pounds of bags on a typical 350. You're still some 60 pounds below ZFW, and there's still enough room for 2,600 pounds of fuel, or 388 gallons. This translates to an NBAA IFR range of some 950 nm, assuming you fly at long-range power settings. Pretty impressive.

But enough math. Step into a 350 and you know you're on a big, big airplane. It stands tall and wide on the ramp, and it's a long way up the airstair door and down the aisle to the front office. A nine-seat, double-club seating arrangement is standard, though optional high-density seating can give you room for 15 passengers.

The cockpit is equally vast. Its organization is standard King Air, and closely resembles the setup in the B200, with Rockwell Collins EFIS tubes on the captain's side, a central multifunction display, and a pedestal-mounted Universal UNS-1K flight management system (FMS). Engine gauges are lined up in vertical stacks to the right of the captain's flight instruments, and the copilot's side has a full set of flight instruments, too. But there's no EFIS on the right side (in standard airplanes); the copilot must make do with an air-driven attitude indicator.

The 350 has some slight improvements over the B200's cockpit. Small autofeather (AFX) annunciator lights are mounted just below the engine interturbine temperature (ITT) gauges, right in the pilot's direct view. This is a change from the B200's setup, where the autofeather lights are low on the panel, and part of a forest of lights on the caution/advisory subpanel unit. Separate volt- and loadmeters are up on the overhead panel, along with the propeller anti-ice ammeters, lighting switches, and windshield wiper controls. In the B200, volt- and loadmeters share dials, and you have to press a button to make them switch between indications. In the 350, you look up and see the electrical system's status in one glance.

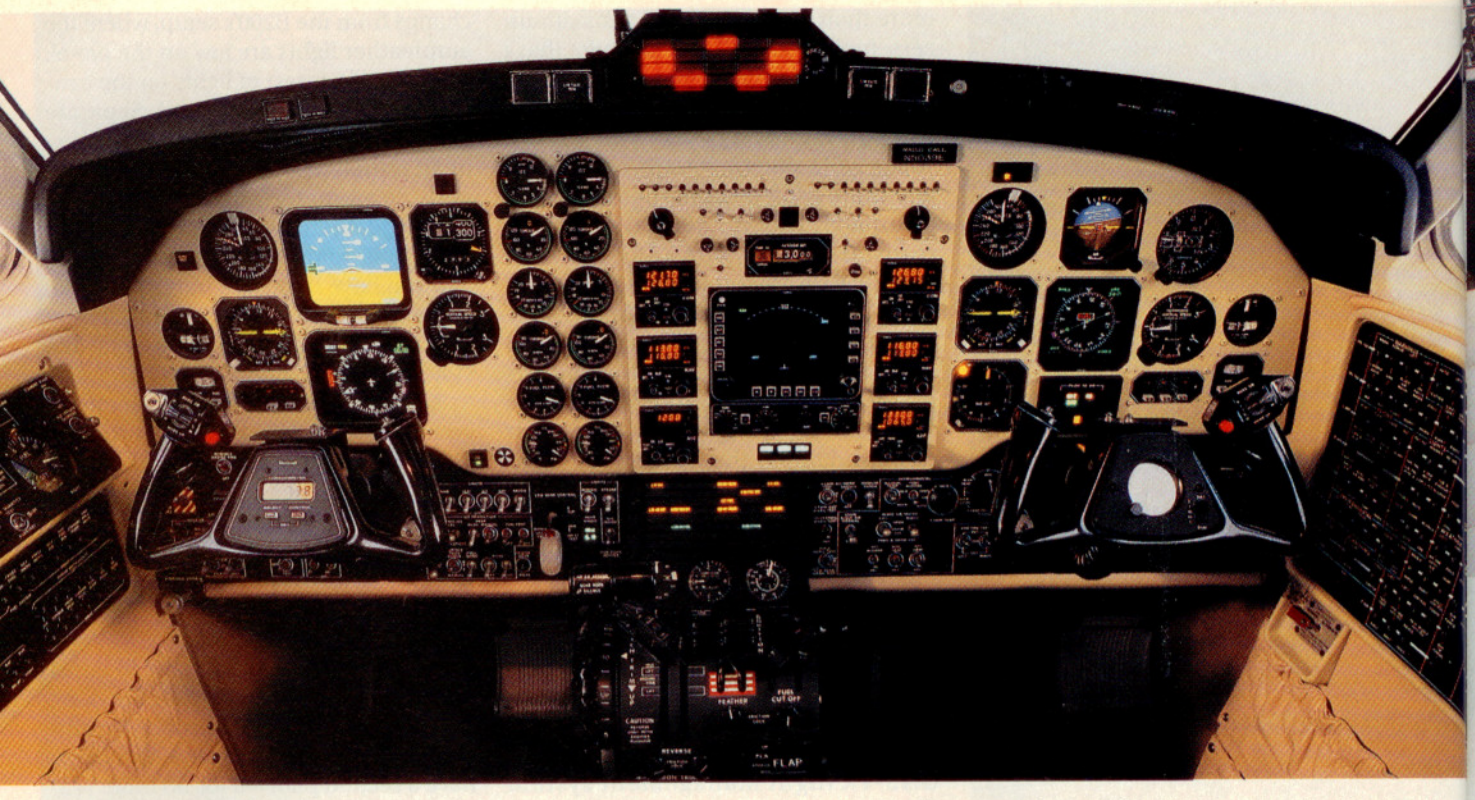
Another change moved the emergency fuel shutoff valves from the left sidewall's fuel system panel to the glareshield. These are push-button switches, not the toggle switches used in earlier King Airs. Another minor change did away with torquemeter readings in pound/feet; now the torque gauges are graduated in percentage units.

After a few hours you'll come to terms with the 350's cockpit, just like any King Air's. Though the 350 is certified for single-pilot operations, it's certainly nice to have a second pilot—if for no other reason than to manage the FMS. The 350 is certified under provisions of FAR Part 23's Commuter category rules, which allow single-pilot operations in propeller-driven airplanes weighing more than 12,500 pounds and having fewer than 10 passenger seats. Order more than nine seats and the 350 must have two pilots at the helm.

My introduction to the King Air 350 came during the delivery of a factory-fresh airplane to a European customer. This particular airplane would be the second reduced vertical separation minimums (RVSM)-equipped King Air to go to Europe. Together with Peter Herr, Raytheon's European sales director, and three passengers, I'd fly legs from AOPA's home base at the Frederick Municipal Airport in Maryland to Bangor, Maine; from Goose Bay, Labrador, Canada, to Reykjavik, Iceland; and from Reykjavik to a fix at latitude 61 degrees north, longitude 10 degrees west.

Of course, loading was a no-brainer. For all legs, we topped off the tanks and climbed aboard; we were still 450 pounds below maximum takeoff weight.

No doubt about it, the 350 is trucky, something you expect from a mini-airliner like this. Sitting high off the ramp reinforces the impression of substance, something that all King Airs do very nicely, and something that does wonders for pilot ego. Taxiing around with those massive, winglet-adorned wings



drives the 350's size home, and so do the airspeeds you calculate prior to takeoff. For the takeoff at Goose Bay, we used 102 knots for V_1 (takeoff decision speed), 108 kt for V_R (rotation speed), and 115 kt for V_2 (takeoff safety speed). Our takeoff field length at the minus-5 degree Celsius ambient temperature was 3,483 feet, but that figure assumes enough distance to clear obstacles or, in case of an engine failure during the takeoff run, an acceleration to V_1 and then braking to a stop. We used Goose's Runway 8, which is 11,046 feet long (Goose is a joint-use airport, and serves as a NATO air forces practice airfield), so this wasn't a factor.

The autofeather system is armed prior to every takeoff. Its purpose is to detect a failing engine and minimize its propeller drag. Should the system sense a drop in torque—the twisting force as measured at the propellers—oil is dumped from the sick engine's propeller hub, a feathering spring kicks in, and the propeller feathers automatically. And it all happens right now! There's another system—rudder boost—that helps pilots more easily cope with the yaw associated with asymmetric thrust in engine-out situations. This system senses torque differences between engines. Should an engine lose power, the system automatically counteracts yawing moments by applying rudder force to the proper pedal. Again, the response is instantaneous. These systems—standard in both the B200 and 350—do wonders to reduce confusion and workload should an engine act up during the critical moments after takeoff.

My first really long leg, from Goose to Reykjavik, would be 1,339 nm and would take four hours, 47 minutes to complete, thanks to headwind components that would peak at around 75 knots near the southern tip of Greenland. When winds like these kick in, the nerves do, too—even if you do have a lot of fuel aboard. The FMS gives real-time status reports of many variables, and one of them is your fuel reserve at the destination. Several times on this leg we saw the FMS calculate a 30-minute fuel reserve at Reykjavik. Not good. As things turned out, we would land with 585 pounds of fuel aboard—enough for one hour, two minutes more flying.

After leveling off at Flight Level 270, power was set at 60-percent torque, 680 degrees ITT, and 1,600 propeller rpm. Fuel flows were adjusted to read 280 pph (42 gph) per engine. The result was a 185-kt indicated airspeed and, at our minus-40 degree Celsius outside air temperature, a true airspeed of 286 kt. This equates to a power setting somewhere between long range and max speed. Firewalled, the 350 will tool along at 315 kt, Raytheon says. But that would mean burning 773 pph (115 gph) per side, and we couldn't afford that over the windy, airport-sparse North Atlantic. So we watched our fuel flows and constantly checked the FMS to see how our fuel reserves were doing.

The arrival at Reykjavik was uneventful, except for some rowdy winds out of the southwest with gusts to 40 mph. It was turbulent, and while the 350 may be a heavy, stable airplane, gusts are gusts, and it was amusing to watch the ship's crab and drift on approach.

Approach flaps can come out at speeds as high as 202 kt, landing gear can be extended once you've slowed to 184 kt, and full flaps can go down at 158 kt. Arm the autofeather, use power (30-percent torque is a good ballpark setting) to follow the proper glide path and to adjust approach speed for 100 kt (for our weight, which was 12,000 pounds), then move the power levers to flight idle as you cross the threshold at 90 kt. As always, getting the flare right takes some practice when learning a new airplane. My landing was firm, but not jarringly so. Hey, it was gusty, right?

A solenoid actuated by a squat switch on the right main gear automatically puts the propellers into a flatter, ground-idle blade angle setting as soon as there's weight on the wheels. This helps to quickly slow the airplane after touchdown. Then the pilot can manually lift the power levers up and over detents to put the props first into the ground-fine range and then into full reverse thrust.

The next day our route would take us from Reykjavik to Siegerland, Germany, then on to Augsburg, Germany, where Raytheon has a service and delivery center, and where Herr hangs his hat. This would be a five-hour trip, and the last half of it would give me a chance to sample the 350's cabin. There's plenty of room, that's for sure, and the seats swivel, translate, and recline into just about any position you'd want. They're berthable, too, meaning that they'll fully recline to serve as beds. Our 350 had a flushing belted toilet behind a sliding wooden partition. All of this is standard equipment, as is the cabin's acoustic canceling system. This uses a network of 24 tiny microphones installed at locations around the cabin. They "listen" for high-frequency noise caused by the four-blade Hartzell propellers, then the system's digital processor calculates and broadcasts out-of-phase, noise-canceling signals—via 12 loudspeakers (see "Pilot Products: Quiet Flight ANCS," page 141). It's an ingenious system that really keeps cabin sound levels under control. Don't believe it? Then turn the system off, using the switch over on the copilot's sidewall. Noise levels will jump noticeably.

According to Herr, European operators like the B200 and 350 because they perform best in the 18,000-to-25,000-foot-altitude range—where jet traffic is less dense—can carry large loads into smaller airports, yet are fast enough to mix in with jet traffic at larger airports. RVSM certification, which requires more accurate, redundant altitude sensors, altitude-hold and -alert features, and dual altitude-reporting transponders, is especially desirable. An RVSM-certified airplane has a wider choice of cruising altitudes in the FL290-to-FL410 range over Europe because vertical separation is reduced to 1,000 feet, as opposed to the 2,000-foot separation minimums used above FL290 in U.S. airspace. Both the B200 and 350 have an RVSM option, which can run to $100,000, and will come in handy in America, too. It's anticipated that RVSM will go into effect in American airspace by 2004.

While Atlantic crossings are certainly atypical B200 and 350 missions, they do demonstrate these airplanes' tremendous payload/range capabilities. And if I had the choice between a two-day, 10-hour crossing in a big King Air and an eight-hour, nonstop ordeal in seat 47B of an airliner, there's no contest. The King Air wins, in my book.

Most 350s are used in corporate fleets, and aren't owner-flown. They serve as corporate shuttles or cargo haulers, flown in two-pilot operations, and have typical passenger loads of six to seven people. Often, they complement larger business jets in a fleet and are used on trips with shorter legs and multiple stops. Some operators have their own fuel farms, take on huge fuel loads, and let their 350 tanker it, obviating the need to buy more expensive fuel while en route. It's for reasons like this that the King Air 350 reigns as the ultimate twin turboprop on the market. A new one may cost $5.8 million, but try to find a jet that will carry the same amount of passengers and fuel. You'd have to spend $2 million more. AOPA

i Links to additional information about King Airs may be found on AOPA Online (www.aopa.org/pilot/links.shtml).

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SPECSHEET

Raytheon Beechcraft King Air 350

Average-equipped price: $5.792 million

Specifications

Powerplants	Pratt & Whitney Canada PT6A-60A, 1,050 shp
Recommended inspection interval	3,600 hr
Propellers	Hartzell four-blade, constant-speed, full-feathering, reversible-pitch, 105-in dia
Length	46 ft 8 in
Height	14 ft 4 in
Wingspan	57 ft 11 in
Wing area	310 sq ft
Wing loading	48.4 lb/sq ft
Power loading	7.14 lb/hp
Seats	2+9/15
Cabin length	24 ft 10 in
Cabin width	54 in
Cabin height	57 in
Basic operating weight	9,640 lb
Maximum ramp weight	15,100 lb
Maximum takeoff weight	15,000 lb
Maximum zero-fuel weight	12,500 lb
Maximum useful load	5,460 lb
Payload w/full fuel	1,849 lb
Maximum landing weight	15,000 lb
Total usable fuel capacity	539 gal (3,611 lb)
Baggage capacity, aft, internal	550 lb

Performance

Takeoff field length, SL	4,192 ft
Takeoff field length, 5,000 ft @ 25 deg C/77 deg F	6,836 ft
Maximum demonstrated crosswind component	20 kt
Rate of climb, sea level	1,800 fpm
Single-engine ROC, sea level	552 fpm
Cruise speed/range w/45-min fuel reserve, full fuel (fuel consumption, ea engine)	
@ Max power setting, 18,000 ft, 12,000 lb	309 kt/1,070 nm (451 pph/67 gph)
@ Max range setting, 28,000 ft, 11,000 lb	225 kt/1,760 nm (183 pph/27 gph)
Maximum operating altitude	35,000 ft
Single-engine service ceiling	21,500 ft
Maximum cabin pressure differential	6.6 psi
Sea-level cabin	15,293 ft
Landing distance over 50-ft obstacle	2,650 ft

Limiting and Recommended Airspeeds

V_{MCA} (min control w/one engine inoperative, air)	94 KIAS
V_{SSE} (minimum safe single engine)	110 KIAS
V_1 (takeoff decision speed)	106 KIAS
V_R (rotation speed)	110 KIAS
V_2 (takeoff safety speed)	117 KIAS
V_X (best angle of climb)	125 KIAS
V_Y (best rate of climb)	140 KIAS
V_{XSE} (best single-engine angle of climb)	125 KIAS
V_{YSE} (best single-engine rate of climb)	125 KIAS
V_A (design maneuvering)	182 KIAS
V_B (turbulent air penetration)	170 KIAS
V_{FE} (max flap extended, approach)	202 KIAS
(max flap extended, full down)	158 KIAS
V_{LE} (max gear extended)	184 KIAS
V_{LO} (max gear operating)	
Extend	184 KIAS
Retract	166 KIAS
V_{MO} (max operating speed, SL-21,000 ft)	263 KIAS
M_{MO} (max Mach number, 21,000-35,000 ft)	Mach 0.58
V_{S1} (stall, clean)	96 KIAS
V_{SO} (stall, in landing configuration)	81 KIAS

For more information, contact Raytheon Aircraft Company, Post Office Box 85, Wichita, Kansas 67201-0085; telephone 316/676-5034; fax 316/676-6614; or visit the Web site (www.raytheon.com/rac).

All specifications are based on manufacturer's calculations. All performance figures are based on standard day, standard atmosphere, sea level, maximum weight conditions unless otherwise noted.