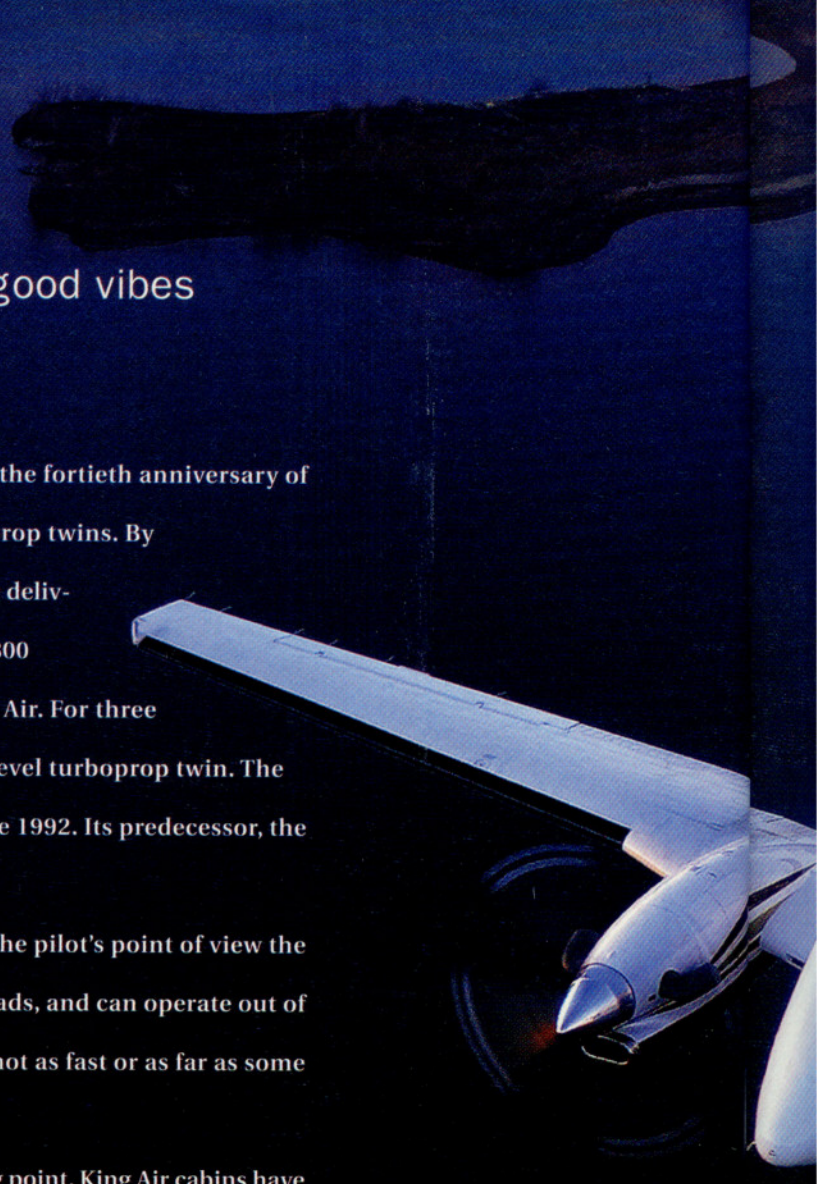

Twin Pratts and a cabin with good vibes

BY THOMAS A. HORNE

King Air C90B Staying power

It may be hard to believe, but next year marks the fortieth anniversary of Raytheon's Beechcraft King Air line of turboprop twins. By then, the company should have announced the delivery of the 6,000th King Air. Of that number, some 2,300 will have been of the model C90—the "baby" King Air. For three generations of pilots, the C90 has been *the* entry-level turboprop twin. The newest C90, the C90B, has been in production since 1992. Its predecessor, the C90A, was in production from 1984 to 1991.

There's a reason for the C90's popularity. From the pilot's point of view the C90s are easy to fly, easy to land, have big useful loads, and can operate out of short fields. C90B cruise speeds and ranges, while not as fast or as far as some competing brands, are still respectable.

Then there's the cabin—always a Beechcraft strong point. King Air cabins have always been huge hits with passengers, and this is certainly no small part of the C90's appeal. Its "square oval" cross-section gives passengers more head- and shoulder room than the turboprop competition—and even some entry-level

PHOTOGRAPHY BY MIKE FIZER

C90B pilots sit tall in the saddle, and work in one of the best-designed cockpits in the business.

business jets—and it has plenty of room for aft baggage storage, too. Four plush seats in a club arrangement, plus a side-facing aft seat and a belted potty, are standard. The aft lavatory's dry chemical toilet comes with the airplane (a flushing chemical toilet is a $6,195 option). For a high-density seating arrangement, newer C90s are certified for as many as 13 seats.

The latest versions of the C90B have been given leather seats that were previously featured only on the "Jaguar" motif variants of earlier C90Bs. Those seats, together with the cabin's nine large polarizing side windows, hardwood trim, storage and refreshment cabinets, large retractable tables, and hefty airstair door, make believers out of the most reluctant travelers. That's especially important if those travelers have a say in the buying decision.

Another signature design element of the C90B is its dynamic vibration absorber (DVA) system. This consists of 26 electronically tuned units bolted to the cabin side walls. They resonate at the same frequency the fuselage does when power is set to the recommended 1,900-rpm cruise propeller setting. The DVAs cancel out low-frequency propeller noise and, together with the airplane's bagged acoustic insulation packs, significantly reduce interior noise and vibration levels. The DVAs are passive, unlike the electrically powered noise-reduction systems used in the C90B's bigger brothers, the King Air B200 and 350.

Noise reduction is important in any airplane, but in the C90B's case the effort goes far beyond tweaking the cabin. It began with the switch from the C90A's three-blade propellers to the B model's four-blade Hartzell props. The four-blade props have smaller radii, which move the propeller tips farther from the cabin and reduce propeller tip speeds—both important sound-reduction variables. Moreover, C90B propeller hubs have lower friction values, so the propeller synchrophaser system kicks in quicker and more effectively than in earlier models.

The C90B uses Pratt & Whitney PT6A-21 turboprop engines of 550 shp—the same reverse-flow, free-turbine engines used in the C90A.

C90B pilots sit tall in the saddle, and work in one of the best-designed cockpits in the business. The overall impression is one of quality, substance, and size. This extends from the tactile (the feel of the yokes, the shape and operation of

The C90B panel now features a Garmin GPS 400—a coup for a company once known only for handheld GPSs.

TOP: COURTESY OF RAYTHEON; BOTTOM, COURTESY OF GARMIN

the switches and other controls) to the logical. Electrical gauges are on the overhead panel, fuel system controls are on the left side-wall panel, engine switches are in front of the left hand, and ice-protection switches are in front of the right. Let your right hand drop to your side and your fingers are poised to hit the autopilot and yaw damper push-button switches. Sounds hackneyed, I know, but these particular controls *do* fall readily to hand.

Collins avionics are standard, and this includes a two-tube EFIS (electronic flight information system) setup comprising an EADI-84 horizon indicator and an EHSI-84 horizontal situation indicator. For GPS navigation, the Garmin GPS 400 is standard. This is basically the Garmin GNS 430 that many of us use in piston singles—but without the VHF navigation and com radio capability. Com radios are Collins' VHF-22C-021 units, available with 8.33 kHz frequency spacing.

The C90B's five-bus (battery, left generator, center, right generator, and triple-fed) electrical system translates into a workload savings. Normally, the triple-fed bus powers the electrical system. This ties together power from both generators and the battery. If a generator conks out, there's an automatic load-shedding feature; no pilot action is necessary to keep electrical loads under control. For starting there's a cross-start relay that lets you start one engine using power from the other engine's generator. In some turboprop twins, the generator of the operating engine must be turned off before the other engine can be started—to prevent voltage overloads and system damage.

Apply power until the torque gauges (these indicate the twisting force acting on the propellers) show a value just under 1,315 lb/ft; let the airplane accelerate to 80 knots (light weights) or 97 kt (max takeoff weight), give a tug on the yoke, and you're off. At a climb speed of 150 kt, you should see climb rates

Cruising at 26,000 feet, a pilot and four passengers can fly at 196 kt and cover 1,040 nm with IFR reserves.

around 2,000 fpm under standard conditions. Should an engine fail, the C90B's autofeather and rudder boost systems (no-go items) kick in. Autofeather senses drops in torque, and automatically moves the propeller of a sick engine to the feather position. Rudder boost works off drops in engine bleed air, and automatically applies rudder force to compensate for the yawing that accompanies engine-out situations. At maximum takeoff weight under standard conditions, single-engine climb rate is advertised as 495 fpm.

Fastest cruise speeds occur at lighter weights in the 16,000- to 20,000-foot range. With torque set just under redline and props turning at 1,900 rpm, true airspeeds of 249 kt can be realized on fuel burns of 88 gph, or 592 pph.

For maximum range, fly higher. C90B performance tables say that at 29,000 feet you can count on 199 KTAS burning 45 gph, or 302 pph. Cruising at 26,000 feet, a pilot and four passengers can fly at 196 KTAS and cover 1,040 nm with NBAA IFR reserves—which include an alternate airport 100 nm from the destination.

Interesting note: Unlike so many other turbine-powered airplanes, the C90B has no zero-fuel weight limitation. Zero-fuel weight (ZFW) is the weight above which all additional loading must be in fuel; this is to limit in-flight wing flexing stresses. Practically speaking, this means that your payload (i.e., passengers and baggage) plus basic operating weight cannot exceed ZFW—which can be thousands of pounds less than maximum takeoff weight. Not having a ZFW means that C90B pilots have more of a payload envelope than with some competing designs.

Landings are real confidence-builders. King Airs are great instrument platforms, and the C90B is no exception. Turn on your recognition lights, check pressurization, turn off the propeller synchrophaser, arm the autofeather, put out the gear and flaps (below 184 KIAS), set power at approximately 400 ft/lb of torque, and your airspeed will eventually settle somewhere around the magic 102-kt value. Slowly pull off power as you reach the runway, touch down at 85 to 90 KIAS, raise the power levers up and back over the first gate and the propellers go into a flatter pitch—ground fine. Pull back some more and you're in reverse thrust. Get out of reverse before decelerating below 50 KIAS—to prevent

Four-blade propellers, a quiet cabin and ergonomically designed leather seats (see page 92) mark the new C90B.

SPECSHEET

Beechcraft King Air C90B

Standard-equipped price: $2.921 million

Specifications

Powerplant .....Pratt & Whitney PT6A-21, 550-shp
Recommended TBO .....3,600 hr
Propellers .....Hartzell four-blade, constant-speed, full-reversing 90-in dia
Length .....35 ft 6 in
Height .....14 ft 3 in
Wingspan .....50 ft 3 in
Wing area .....293.9 sq ft
Wing loading .....32.8 lb/sq ft
Power loading .....8.8 lb/shp
Seats .....1 + 6/12
Cabin length .....12 ft 8 in
Cabin width .....4 ft 6 in
Cabin height .....4 ft 10 in
Basic empty weight .....6,810 lb
Max ramp weight .....10,160 lb
Max takeoff weight .....10,100 lb
Max useful load .....3,120 lb
Payload w/full fuel .....547 lb
Fuel w/max payload .....948 lb
Max landing weight .....9,600 lb
Fuel capacity, std .....384 gal (2,573 lb)
Baggage capacity,
Nose compartment .....350 lb, 16 cu ft
Aft compartment .....350 lb, 48.3 cu ft

Performance

Takeoff distance over 50-ft obstacle, SL, std conditions .....2,710 ft
Takeoff distance over 50-ft obstacle, 5,000 ft @ 25 deg C/77 deg F .....4,600 ft
Max demonstrated crosswind component .....25 kt
Rate of climb, sea level .....2,010 fpm
Engine-out ROC, sea level .....495 fpm
Cruise speed/range w/NBAA fuel rsv, 4 pax (fuel consumption, ea engine)
@ Max power setting, 16,000 ft .....246 KTAS/738 nm (592 pph/88 gph)
@ Max range setting, 29,000 ft .....196 KTAS/1,049 nm (309 pph/46 gph)
Max operating altitude .....30,000 ft
Service ceiling .....28,900 ft
Single-engine service ceiling .....14,800 ft
Sea-level cabin .....11,065 ft
Landing distance over 50-ft obstacle (without reverse) .....2,290 ft
Landing distance, ground roll (without reverse) .....1,260 ft

Limiting and Recommended Airspeeds

V_{MC} (min control w/critical engine inoperative) .....80 KIAS
V_{SSE} (min intentional one-engine operation) .....97 KIAS
V_X (best angle of climb) .....101 KIAS
V_Y (best rate of climb) .....112 KIAS

V_{XSE} (best single-engine angle of climb) .....100 KIAS
V_{YSE} (best single-engine rate of climb) .....108 KIAS
V_A (design maneuvering) .....169 KIAS
V_{FE} (max flap extended) .....148 KIAS
V_{LE} (max gear extended) .....182 KIAS
V_{LO} (max gear operating)
Extend .....182 KIAS
Retract .....163 KIAS
V_{MO} (max operating speed) .....226 KIAS
M_{MO} (max Mach number) .....M 0.46
V_{S1} (stall, clean) .....88 KIAS
V_{SO} (stall, in landing configuration) ..78 KIAS

For more information, contact Raytheon Aircraft Company, Post Office Box 85, Wichita, Kansas 67201-0085; telephone 316/676-5034; fax 316/676-6614; www.raytheonaircraft.com

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

"It's a great IFR airplane—a little heavy on the controls, but very nice hands-free...it treats single pilots very well."

engine ingestion of dirt and other foreign objects, and use your toe brakes to come to a complete stop. Without reverse, you should stop well under 3,000 feet. With reverse, halve that distance.

In spite of its popularity through recessions, wars, and an onslaught of competitors the King Air does have its detractors. At $3 million, some say it's too expensive. At 40, some say its design is dated. Or that it's too slow for the money. So who bought 21 new C90Bs last year?

Brad Stringer, president of Kaysville, Utah-based Inceptio Medical Technologies, for one. Stringer moved up from a Mooney Bravo to a C90B with only 500 hours in his logbook—and a need for a capable twin turboprop to fly up to five passengers (and an occasional 130-pound ultrasonic imager) to places like Chicago, Philadelphia, and San Diego. Stringer admits that the step up from a Mooney was a big one, but his education included not just the free FlightSafety International pilot training that came with the airplane, but 150 insurance-mandated hours with an experienced King Air pilot riding shotgun in his first months of ownership.

Now Stringer is at home in his King Air. "It takes about 100 to 150 hours to get comfortable," he said. "But it's a great IFR airplane—a little heavy on the controls, but very nice hands-free...it treats single pilots very well.

"I can make it from my home base at Ogden, Utah, to Philadelphia with just one stop, and I can beat the airlines by two or more hours," Stringer went on. "And with the way airline travel is these days you can't really put a price on avoiding those hassles."

The discussion shifted to other airplanes he compared against the C90B. The cabins were usually too small, he said. Had he thought of a light jet? "Forget about it," he said. "The insurance companies won't even touch me."

Had Stringer thought of making a deposit on one of the passel of new light-light twin turbofans surfacing on the horizon? His answer went to the core of the King Air's carefully cultivated image as conservative and traditional—a safe bet with comfort, stature, and a reassuring subliminal message.

"Look, I know there are more recent designs out there, but with 24 million hours on the King Air fleet it's a proven aircraft. And that's important to me. I don't *want* to be 'leading edge' out there."

For 2003, Raytheon estimates it will sell 78 King Airs of all types. About one-third of them ought to be C90Bs. There may well be some changes to the King Air's systems or interior appointments, but the basic airplane will stay the same. It appears not to be broken. AOPA

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