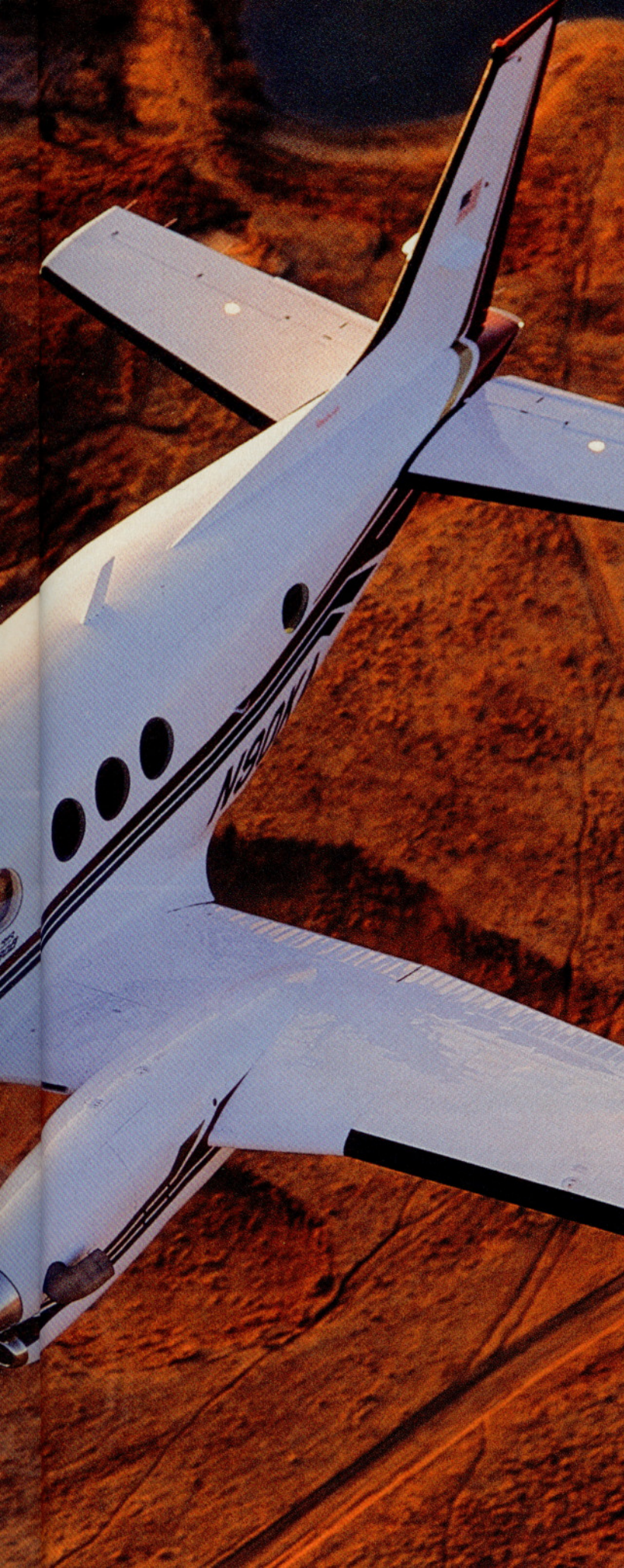




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BEECH KING AIR C90B

FROM A TO B, QUIETLY

The comfort King

BY MARK R. TWOMBLY

THE trip from Frederick, Maryland, to First Flight, an unattended, 3,000-foot strip adjacent to the Wright Brothers Memorial at Kill Devil Hills, North Carolina, began with a climb through some very roily air and thick clouds that blanketed much of the eastern half of the United States. Over lunch in Kitty Hawk, I apologized to our passengers for the turbulence. That came as a surprise to them; they hadn't really taken notice. ■ The conditions we en-

PHOTOGRAPHY BY MIKE FIZER

countered bring out the best in the Beech King Air C90. It's big and stable and soaks up the bumps, yet effortless handling makes it seem much smaller, more nimble. Even in wash-board-rough air, fingertip-light control pressures make hand flying a pleasure.

Various King Air models have come and gone since the original 90 was introduced in 1964, but through the years and the changes, the 90 has soldiered on. It's still referred to as the "littles" or "entry level" King Air, but at a ramp weight of 10,160 pounds and an asking price of \$2,162,300, it hardly qualifies as either small or a starter. What it does offer is big-cabin comfort, small-airplane handling, a stable ride, and Beechcraft sturdiness in a tidier, less expensive package than other King Air models.

Beech has just introduced a new version of the C90, the C90B. Savvy King Air spotters will notice that this newest 90 has four-blade, 90-inch-diameter McCauley propellers; the C90A carries three-blade Hartzells. New as well are longer prop spinners, which enclose improved low-friction hubs for more precise synchronizing and phasing of left and right props. The propeller blades are dynamically balanced to further reduce vibration. Other exterior changes over the C90A include an electronic outside air temperature probe, a new logo, and a new paint design.

Many more changes are evident in the cabin. Some address comfort and styling, others noise and vibration reduction. In fact, greater creature comfort is what the C90B is all about. The basic airframe and 550-shaft-horsepower Pratt & Whitney PT6A-21 engines are the same as the earlier C90A (N90KA—serial number LJ1288—the first C90B built and the one we flew for this report, has the 10,000th PT6A that Pratt & Whitney has delivered to Beech); the new propellers yield some slight performance enhancements—and in certain flight regimes, losses—but the real reason for the C90B is to give passengers and crew a quieter, smoother, and more comfortable ride.

The C90B was a \$1-million development program for Beech. The retail price of the airplane is \$176,000 more than the C90A. Included in the base price are Collins remote-mounted radios and a 4-inch electronic horizontal situation indicator. If a customer insists on panel-mounted radios instead of the remotes, it will cost extra. Beginning with the 1993 model year, the two-tube Collins EFIS-84 system will be standard on the C90B along with the APS-65H autopilot, the same model installed in the Super King Air 350. A third multifunction display will be optional. The Collins remote boxes occupy the nose bay otherwise available for baggage. A plastic sheet on the inside of the nose baggage door protects the remote boxes from moisture contamination.

The cabin interior has been restyled to bring



Three reasons for the C90B's quieter interior: dynamic vibration absorbers (foreground), bagged insulation (center), and thick foil swatches to defeat oil canning.





it up to the standard of the 350. The headliner, sidewall panels, and floorboards are made of composite honeycomb panels for lower weight and better sound absorption. They also are easier to remove for inspections and maintenance of the airframe. The C90A headliner with its metal channels has been replaced by a three-piece interlocking affair that makes for a smoother, seamless look. Window frames—unadorned plastic panels in the C90A—are now covered with stretched wool for a clean, sophisticated appearance. Concealed fluorescent lights provide bright or dim indirect lighting.

Beech's remake of the cabin extends to the carpeting. It's new, made from loop fibers instead of the former pile carpeting, and it covers all but 7 inches of each seat track. This makes for a cleaner appearance and also cuts down on the noise and cold that the metal tracks transmit from the airframe into the cabin.

Passenger chairs are the same track-mounted frames as on earlier 90s—pedestal seats being too heavy for this King Air, according to Beech. But the leather upholstery, a loose-cushion-style seat and a pillowed back, is similar to the 350. Beech managed to come up with 6 inches more legroom in the club seating by reshaping the seat backs and redesigning the rear side-facing seat and potty partition.

The sidewall panels incorporate integral armrests, writing tables, and cup holders. The appearance and quality of the interior is what you'd expect to see in a new jet.

The C90B's standard interior is for non-smoking teetotalers. Ashtrays have been replaced by cup holders, no cigarette lighters are provided, the "No Smoking" sign is constantly on in the passenger cabin, and there is no bar—it's an extra-cost option.

Some of the most significant changes in the C90B are hidden from view. Beech sought to reduce noise and vibration using three techniques: applying thick aluminum foil panels to the inside of the skin to dampen oil canning; bagging the insulation to preclude water absorption, which destroys any vibration dampening the insulation provides; and attaching 26 "electronically tuned dynamic vibration absorbers" to various fuselage frames. The vibration absorbers are ingenious devices, basically a set of opposed weights precisely positioned to soak up 125-hertz vibration. Beech engineers determined that to be the vibration-inducing frequency generated by the prop pulses at the 1,900-rpm cruise setting.

You know those weighted tuning forks hidden behind the interior panels work because, at the cruise-climb prop setting of 2,000 rpm, the racket is considerably higher than at cruise power. Retard the props to 1,900 rpm, and the audible and tactile buzz from the prop blast pummeling the airframe smooths out to little more than background noise. The changes to

the interior add 36 pounds to the empty weight of the airplane compared to the C90A.

Beech claims that the sound level in the C90B cabin has been reduced an average of 4.3 decibels compared to the C90A. The greatest reduction, 6.8 dB, occurred in the area of the aft-facing seat behind the copilot. We didn't have the equipment to take precise decibel measurements in the cabin during our day of flying. Our evaluation was more subjective but no less convincing. The overall effect of the changes on noise level and vibration in the C90B is dramatic, especially at higher altitudes where indicated airspeeds are lower. Passengers can talk and listen to each other comfortably, without having to huddle or raise their voices. That's unusual in a propeller-driven airplane. The quieter, smoother, more aesthetically pleasing cabin environment in the C90B will make for less fatiguing, more enjoyable flights.

Pilots of C90Bs benefit, too, from some changes in the cockpit. For one, it's quieter up front; some vibration dampeners are located just behind the cockpit partition, and insulation has been installed behind the side panels. Flaps selection has been made easier with the addition of the 350's flap preselect system.

A ground fine gate has been added to the power controls. Ground fine replaces the Beta range, flattening blade pitch and increasing prop rpm compared to idle power. It's used for taxiing and, for those careful pilots who choose to do so even though it's not required on the C90, computing accelerate-stop and landing distances. They are shorter—3,650 feet and 2,290 feet, respectively—compared to the C90A. The Federal Aviation Administration does not permit the use of reverse thrust in figuring runway requirements but does allow for ground fine, which can be selected more quickly and positively than Beta or reverse.

Compared to the three-blade props on the C90A, the smaller diameter four-blade discs on the C90B produce less thrust at high power settings and low airspeeds. That means that at gross weight, the C90B has a slightly longer two-engine takeoff run than its predecessor. The good news is that less low-speed, high-power thrust means V_{MC} goes down—a full 10 knots, to 80 KIAS on the C90B. That, in turn, results in a shorter accelerate-go runway requirement. (Normal two-engine takeoff distances shrink substantially at reduced takeoff weights because V_{MC} , and thus rotation speed, declines. At a takeoff weight of 9,000 pounds, rotation speed is 87 KIAS—11 knots less than the C90A.)

The payback for slightly less thrust at lower speed is a bit more thrust from the four-blade props on the high end of the airspeed indicator. The extra punch derives from the increased ram effect of the fourth propeller blade, according to Beech. Officially, there is no change in climb, cruise, range, and endurance specifi-





cations compared to the C90A, but on our flights, we consistently bested book figures with a few more knots airspeed and slightly lower fuel flow. For example, at 28,000 feet, where the temperature was 10 degrees Celsius warmer than standard, we adjusted power to a max cruise setting of 760 pounds torque and a total fuel flow of 345 pounds per hour. True airspeed settled on 225 knots; the book promised 5 knots less on 33-pph more fuel.

On the descent into First Flight, we leveled at 15,500 to do some airwork, beginning with a check of the high-speed cruise numbers. With the power adjusted to 1,180 pounds torque, we observed a combined fuel flow of 535 pounds and an indicated airspeed of 195 knots, which worked out to 251 knots true. Again, both speed and fuel-flow figures were better than book.

C90B drivers should be flying higher than is typical in the C90A. The airplane is quickest—and thirstiest—in the high teens but at its quietest and most fuel-miserly in the high 20s.

Following the cruise check, we sampled a couple of landing configuration stalls. The stall break was preceded by sharp buffeting, and the recovery ate up about 200 feet of altitude before we were flying again. As a last exercise, we shut down the left engine to see how the autofeather system performed. It took about two seconds for the system to recognize that power had gone to idle on the left engine and begin the feathering sequence. At the same time, bleed air from the operating engine boosted rudder pressure to maintain heading. In a few seconds, the prop had stopped, and the turn coordinator ball was resting just off center. The system is configured to feather the engine more quickly at low speed and high power—in other words, on takeoff and initial climb—when an engine failure is most critical. The autofeather system, which is standard on the C90B, makes dealing with an engine failure simple and safe, especially for single-pilot operations.

N90KA weighed in at about 9,830 pounds for our flight that day. That was with five people, bags, and 2,000 pounds of fuel (out of a maximum usable fuel capacity of 2,573 pounds). Full-fuel payload of N90KA is 856 pounds. We did all of our flying—the trip to Kitty Hawk in the flight levels, airwork, a couple of takeoffs and landings at First Flight, and the return to Frederick, with the last third of the trip via low-level vectors in IMC, ending with an instrument approach—without refueling.

The 90 has never been the fastest, most fuel-efficient, or cheapest turboprop. But it always has been the one with the best handling and among the easiest to fly. Most importantly, the large cabin is in a class by itself. Even though the C90 has outlasted all of its competitors, Beech has made it a better airplane, particularly for those who will be riding around in the back of it. □