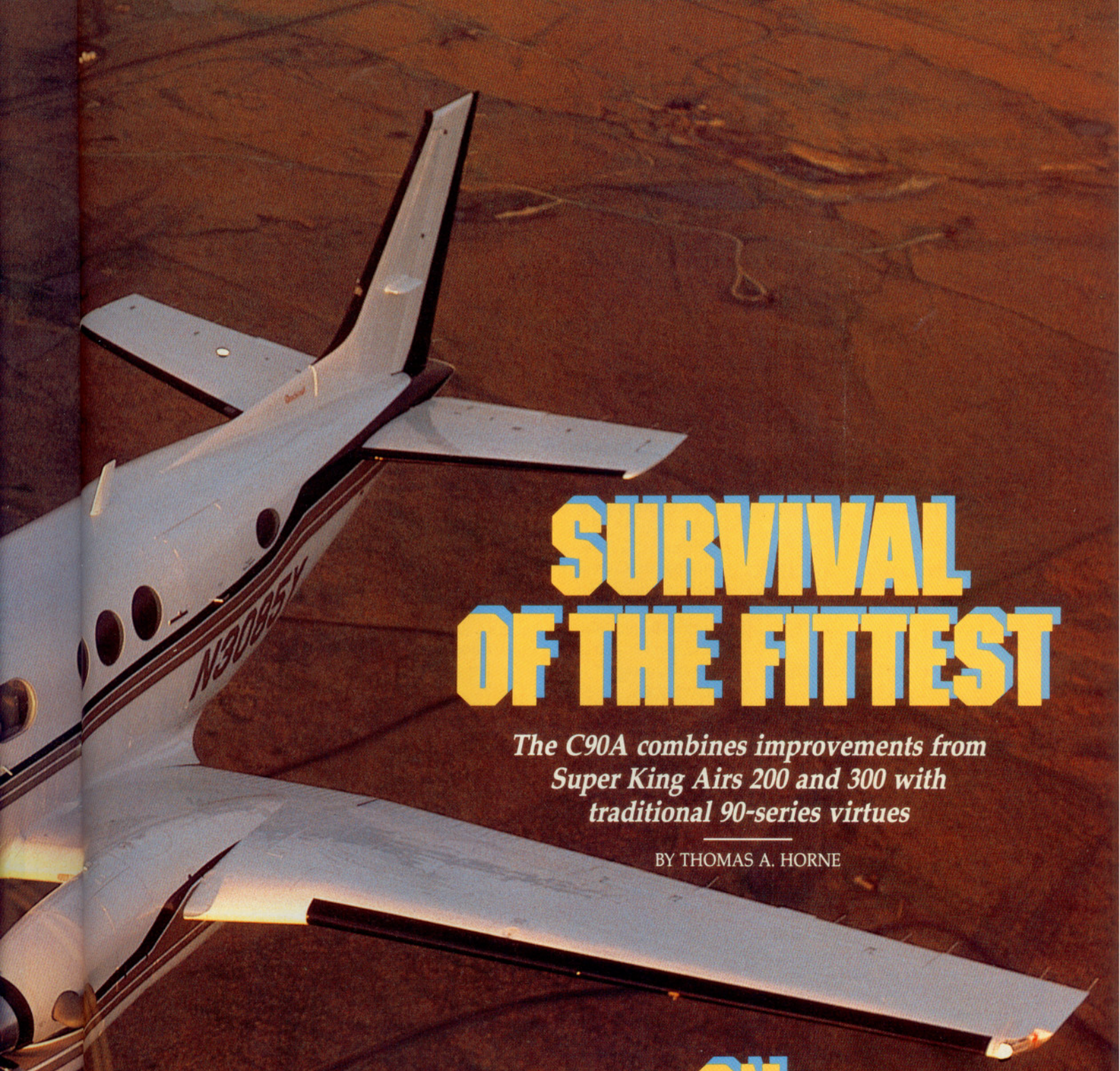


SURVIVAL OF THE FITTEST

The C90A combines improvements from Super King Airs 200 and 300 with traditional 90-series virtues

BY THOMAS A. HORNE

ON May 15, 1963, test flights of the first King Air—dubbed the Model 90—ushered in what was to become Beech Aircraft Corporation's 25-year dominance of the owner-flown turboprop market. Great urgency and doubt prevailed at the time. Would it have been better to stay with other prototypes? Beech had toyed with the idea of building a larger turboprop twin—the Model 120—powered by 917-shaft-horsepower Turbomeca Astazou engines. There were thoughts of building on the pressurized Model 85 Queen Air. A decision had to made quickly because the competition was also gearing up

PHOTOGRAPHY BY MIKE FIZER

for this new, upscale market. And the largest share of that market would more than likely go to the manufacturer that was quickest on the draw.

By choosing the dependable Pratt & Whitney PT6A engine and making great use of tooling from the Queen Air production line, Beech used a little bit of the old and the new in building the first King Air 90s. Now, with the benefit of 20/20 hindsight, we can see that all the right decisions were made. The Queen Air tooling created great efficiencies in production and kept costs (and prices) relatively low. The PT6 engines, while not as powerful as the Turbomecas, presented less of a work load for the neophyte turbine pilot. In the fall of 1964, deliveries of King Air 90s began.

From then on, there was no looking back. The King Air soon earned a reputation as comfortable for pilots and passengers alike. Those stepping up from piston twins—especially the Queen Air—felt right at home. Those stepping down from the larger cabin-class airplanes of the day found the King Air a respectable alternative. And the King Air line has stood the test of time. Since its inception, more than 4,000 King Airs have been sold. Of this number, approximately half represent King Airs of the 90 series.

For a 'little' turboprop, the standard C90A has more than a few features normally found only in much larger and more sophisticated airplanes.

•

Today, the C90A, introduced in 1984, is the only 90-series King Air still in production. It is the beneficiary of the systems modernizations, upgrades, and lessons learned in the manufacturing and servicing of all predecessor King Airs. This includes the flagships of the Beech turboprop line—the seven- to 15-seat B200 Super King Air, with 850-shp engines, and the more powerful Super King Air 300, with 1,050-shp engines. For a "little" turboprop, the standard C90A has more than a few features normally found only in much larger and more sophisticated airplanes.

Take the C90A's electrical system. It features the same five-bus (battery, right generator, center, left generator, and triple-fed) system as that of the Super King Air 300. In normal operations, the triple-fed bus feeds the entire system. It ties together the power from both generators and the battery. In the event of a generator failure, the system automatically sheds electrical loads drawn from the center bus. A cross-start relay allows generator power from one engine to assist in starting the other, which greatly simplifies the start procedure.

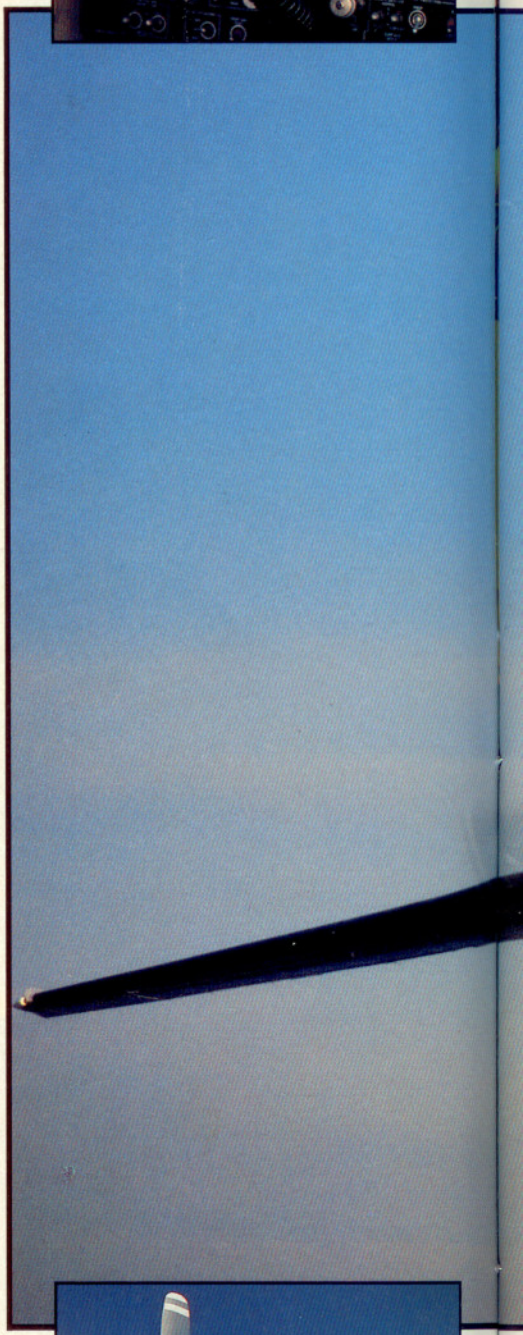
A new feature of the C90A is the Sankyo high-capacity heating and air conditioning system. This allows the pilot using a ground power unit to control the amount of cabin heating or cooling prior to engine start. Previous systems required pilots to use engine power in order to have good control over cabin temperature.

Standard features also include a full package of Collins avionics, complete with an EHSI-74, a single-tube electronic horizontal situation indicator; a WXR-270 color weather radar; an APS-65 autopilot; and all the other avionics one might expect to find in an airplane of this class.

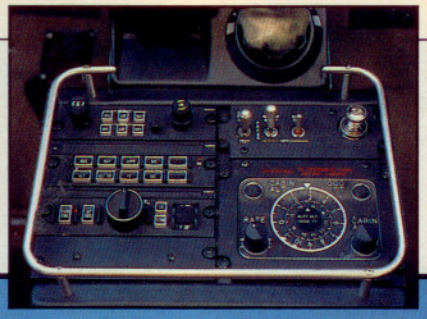
The pressurization system has a 5.0-psi pressure differential, a reflection of the upgrade from a 4.6-psi system made with the 1982 C90. This increase was made possible chiefly by strengthening the door structure—essentially that of a B200—and boosting internal engine temperature limits, a change begun in 1983 with certain C90-1 models that also increased the C90-1's maximum cruise speed to 235 KTAS, up from the C90s' somewhat doggy 220 KTAS.

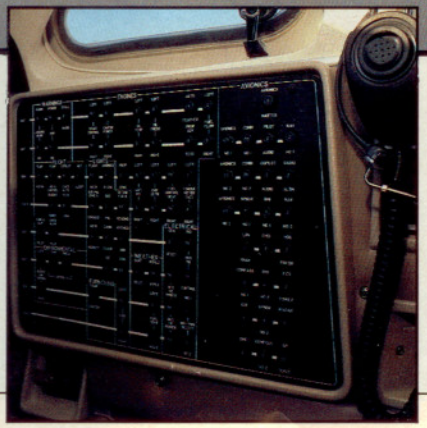
The C90A picked up even more speed with the help of redesigned inlet cowls. These "pitot cowls," as Beech likes to call them, have almost half the inlet area of previous 90-series King Airs and force approximately 30 percent more ram air through the airplane's 550-shp Pratt & Whitney PT6A-21 engines. The result: a maximum cruise speed increase of 12 knots, to 247 KTAS, and a 200-fpm increase in climb performance. The pitot cowls are easy to spot on the ramp. Older King Airs have big, smile-like air inlets under their propeller hubs. The pitot cowls are smaller, oval-shaped, and protrude more than earlier cowls.

Other improvements that the new C90A inherits from earlier models include a hydraulically actuated landing gear system, increased landing gear and




WPT 2
615
DTK
353
SPD
036
LRN





flap operating speeds, a rudder boost system that helps overcome the high rudder forces required in single-engine operations, and redesigned wing spars and attach fittings. The new spar attach points use a triple-clevis fitting that distributes loads more evenly than the earlier fittings.

Given all these improvements, it seemed that by 1987 the C90A had reached its ultimate design evolution,

It is in the approach and landing phases that one discovers how easy a King Air is to fly—especially a 90 series.

but another improvement of the airplane's capabilities was announced on April 9, 1987: a 450-pound increase in gross weight, nearly all of which added to the C90A's useful load. This increase was made possible by a minor strengthening of the airplane's horizontal stabilizer assembly and refinements to the wing spar center section.

In practical terms, the gross weight increase means that the most recent C90As can take on a full load of fuel and carry at least two more passengers than earlier models, for a total full-fuel passenger load of four to five persons. All of this with very slight range and runway performance penalties and no change to cruise speeds.

Our evaluation airplane, N3085Y, is typically well equipped. Its only optional equipment was a Foster LNS616A area navigation system, lateral tracking cabin chairs, and a four-speaker cabin paging system. Our empty weight was 6,614 pounds. Top off the tanks with 384 gallons (2,573 pounds) of Jet-A, and there is still a long way to go (973 pounds) before reaching the airplane's 10,160-pound ramp weight.

Our takeoff weight might have been 9,800 pounds or so, but the airplane cer-

tainly did not feel like it. Nosewheel steering pressures are relatively light, and the airplane accelerated quickly to the 95-KIAS rotation speed, then rushed toward the recommended climb speed of 140 KIAS once airborne. At 15,000 feet and near-standard atmospheric conditions, the airplane turned in a maximum-power cruise speed of 247 KTAS—right on book—and a fuel burn of 300 pph (44.7 gph) per engine.

It is above 18,000 feet that engine power begins to drop off, and one has to keep a close eye on the interstage-turbine temperature (ITT) gauges to make sure that the red line of 695 degrees Celsius is not exceeded. The C90A has a 28,900-foot service ceiling, so the higher altitudes are best for cruising at maximum-range power settings, at which ITT red lines are not usually a problem and fuel burns are drastically reduced. Our flight from Kansas City, Missouri, to Tulsa, Oklahoma, began with a 20-minute climb to FL260. Maximum-range power was set, and fuel burn was now 210 pph (31.3 gph) per engine. Our speed wasn't bad, either. Indicated airspeed was 160 knots, but thanks to the thin air we recorded 244 KTAS.

It is in the approach and landing phases that one discovers how easy a King Air is to fly—especially a 90 series. Work load is relatively low, and anyone accustomed to flying a high-performance light twin (or complex single, for that matter) should be landing like a pro after a little practice and coaching. It floats with too much airspeed, sinks with too little, and flares just beautifully if flown over the fence at 100 KIAS. There, I've said it! A turboprop twin can be surprisingly easy to fly, even for those new to the breed.

That statement should explain why this particular airplane has outlived its other 90-series stablemates—and all other entry-level turboprops, for that matter. An airplane able to carry normal

passenger loads at a comfortable altitude, withstand most icing conditions, avoid severe weather, travel over 1,000 nautical miles on a single fuel load, hold a great deal of its value in the used marketplace, and still be reassuring to fly is a winner indeed. Formalized training is a must—and it's included in the price of every King Air—but the C90A really asks very little in terms of its normal and emergency procedures.

Besides, it's comfortable. The cockpit seats adjust vertically as well as horizontally, and the center pedestal has been shortened a bit, making for more graceful cockpit entries and exits than in its predecessors. It's quiet, too, having generous attention to soundproofing. That goes double for the passengers, who can enjoy the extra elbow room of the lateral tracking seats.

•

I had plenty of time to reflect on these niceties on my flight back from Wichita. On an MD-80. Packed to the gills. Sandwiched between a 300-pound turquoise collector and a woman with a screaming baby. Delayed 30 minutes while taxiing. Forced into an unusual attitude by a cruel seat pitch. Counting the minutes until touchdown. This is business flying? No wonder the 90 series has held such appeal, and why its latest iteration should continue the tradition. □

1988 Beechcraft King Air C90A
Base price: $1,640,000
AOPA Pilot Operations/Equipment Category
All-weather: $1,640,000
Price as tested: $1,687,405

Specifications

Powerplant(s)	2 P & W PT6A-21 550-shp (flat-rated)
Recommended TBO	3,500 hr
Propeller	Hartzell 3-blade, constant speed, full-feathering, reversible pitch, 93-in diameter
Length	35 ft 6 in
Height	14 ft 3 in
Wingspan	50 ft 3 in
Wing area	293.94 sq ft
Wing loading	32.8 lb/sq ft
Power loading	8.8 lb/shp
Seats	8-10
Cabin length	155 in
Cabin width	54 in
Cabin height	57 in
Empty weight	6,580 lb
Empty weight, as tested	6,614 lb
Max ramp weight	10,160 lb
Useful load	3,580 lb
Useful load, as tested	3,546 lb
Useful load w/full fuel	1,007 lb
Useful load w/full fuel, as tested	973 lb
Max takeoff weight	10,100 lb
Max landing weight	9,600 lb
Zero fuel weight	no structural limitation
Fuel capacity, std	2,593 lb (2,573 lb usable) 387 gal (384 gal usable)
Oil capacity, ea engine	14 qt
Nose avionics/baggage capacity	350 lb, 16 cu ft
Aft baggage capacity	350 lb, 53.5 cu ft

Performance

Takeoff distance, ground run	1,885 ft
Takeoff distance over 50-ft obst	2,577 ft
Accelerate/stop distance	4,042 ft
Accelerate/go distance	4,400 ft
Rate of climb, sea level	2,003 fpm
Single-engine ROC, sea level	554 fpm
Max level speed	247 kt
Cruise speed/Range w/45-min rsv, std fuel (fuel consumption, ea engine)	
@ maximum cruise power, 9,500 lb	
14,000 ft	247 kt/1,022 nm (622 pph/92.8 gph)
@ maximum range power, 8,500 lb	
22,000 ft	193 kt/1,277 nm (320 pph/48 gph)
Max operating altitude	30,000 ft
Service ceiling	28,900 ft
Single-engine service ceiling	14,260 ft
Landing distance over 50-ft obst	2,078 ft
Landing distance, ground roll	1,036 ft

Limiting and Recommended Airspeeds

Vmc (min control w/critical engine inoperative	90 KIAS
Vsse (min intentional one-engine operation)	97 KIAS
Vx (best angle of climb)	101 KIAS
Vy (best rate of climb)	112 KIAS
Vxse (best single-engine angle of climb)	100 KIAS
Vyse (best single-engine rate of climb)	108 KIAS
Va (design maneuvering)	169 KIAS
Vfe (max flap extended)	184 KIAS
Vle (max gear extended)	182 KIAS
Vlo (max gear operating)	
Extend	182 KIAS
Retract	163 KIAS
Vmo (max operating speed)	226 KIAS
Mmo (max operating mach number)	.46 Mach
Vr (rotation)	97 KIAS
Vs1 (stall clean)	88 KIAS
Vso (stall in landing configuration)	78 KIAS

All specifications are based on manufacturer's calculations. All performance figures are based on International Standard Atmosphere and gross weight conditions unless otherwise noted. □