

## The Super King Air 200

*Beech's new King Air, equipped with a T-tail and 850 shp PT6As, is nearing certification and will be aimed squarely at the Citation market.*

**By Richard N. Aarons**

The strangest sight in the Midwest this past summer has been an aircraft which looks like a King Air coming and a Learjet going. It is, in fact, the Super King Air 200, a T-tailed turboprop executive transport powered by new dash 41 PT6As that give it enough power to compete with the turboprop Citation while retaining the agility inherited from its regal predecessors.

The Super King Air fuselage from cockpit bulkhead to aft cabin bulkhead is identical to that of the King Air A100 ("Beech King Air A100," B/CA, March 1973). Measurement from bulkhead to bulkhead is 16.7 feet. Aisle height is 4.8 feet and cabin width is 4.5 feet.

Initially, interiors offered for the 200 will be the same as those designed for the A100. The cabin volume is 393 cubic feet.

The Model 200 could stand alone as a wholly new airplane, but it's convenient to describe it in terms of the A100 because most of us are familiar with that aircraft. As mentioned above, the fuselages are identical, but the empennage, wings, engines and many of the systems are new in the 200. The empennage with its giant T-tail is, of course, the most noticeable change, but even if Beech had stuck with a conventional empennage for the Super King Air, its performance would be substantially better than that of the A100 because of the 200's new engines and wings.

The engines are United Aircraft of Canada PT6A41s flat rated at 850 shp, meaning they'll deliver 850 shp at sea level in temperatures up to 106°F, or, in standard conditions, up to an altitude of 6,500 feet. (The A100 is powered by PT6A-28s flat-rated at 680 shp.) Since the dash 41 engine has slightly larger dimensions than the dash 28, Beech has redesigned the nacelle; the result is a unit with smaller frontal area and improved maintenance access.

Engine air intakes are bleed air heated (as opposed to electric lip boots on the A100) and ice vanes have been redesigned for easier actuation. These engines will have an initial TBO of 1,500 hours.

The Super King Air's wing span is 54.6 feet compared with 45.9 feet for the A100. Fifty inches of this stretch is in the inboard panels (25 inches per side); the rest is gained through the addition of longer ailerons and wing tips. The new inboard panels move the powerplant centerline 25 inches farther away from the cabin and therefore reduce cockpit and cabin noise levels. And the inboard inserts also provide more room for fuel. The Model 200's total capacity is 3,658 pounds compared with the A100's 3,149. Capacitance gauging, which reads out in pounds, is standard.

Exterior fuselage length is 43.6 feet. The height is 14.96 feet.

The Model 200's environmental system is completely changed from the A100 and several of these changes reflect the capabilities of the new powerplants. The air-conditioning system, for example, has an engine-driven compressor rather than the electrically driven compressor found on other King Airs. Larger distribution ducts have been provided for improved air flow and the customer can opt for a dual evaporator system (fore and aft) providing a 32,000 BTU cooling capacity.

The most significant environmental system change, however, is the new cabin pressure differential. The A100 is limited to 4.6 psi. The 200's 6.0 psi maximum differential will provide a sea-level cabin to 13,820 feet and an 8,000-foot cabin at 27,500 feet.

The aircraft will be certificated to 31,000 feet and the new pressurization system will maintain a 9,840-foot cabin at that altitude.

Beech has eliminated the giant, current-gobbling, eight-element electric heater found in smaller King Airs and will depend on bleed air alone (an improved system) for heating the Super King Air cabin. The customer, if he's the easily-chilled type, can opt for electric radiant heat panels in the cabin.

The Model 200 will be "tested and approved for flight under FAR 25 (transport category) icing certification requirements," according to its designers. To get that approval Beech has gone to new dual, electrically heated windshields providing full-panel anti-ice. The rest of the system is similar to that used on other King Airs, with the exception of hot air heated air inlets and electrically operated engine inertial separators. King Air pilots will especially like the latter feature because no more skinned knuckles and ripped fingernails trying to get the separator handles out.

The unusual T-tail design was selected, say Beech engineers, to improve the aircraft's drag profile and to produce smoother flight characteristics. The horizontal portion of a T-tail sits in undisturbed air, out of the way of both wing wash and propeller slipstreams. Lack of airframe-induced turbulence means the T-tail mounted elevator will be more effective than its conventional counterpart. Thus control areas can be reduced and cg ranges can be increased. The horizontal surface can be lighter too, because it's not subjected to the constant fatigue-producing vibration that plagues standard horizontal tail planes. This, in turn, means that passengers will feel less propeller vibration in cruise configuration.

One liability of the T-tail is its reputed susceptibility to the deep stall. Beech's engineers point out, however, that the reputation is the result of experiences with T-tails on swept-wing aircraft. They say there is no reason to believe the 200's straight wing and T-tail configuration will be subject to the problem.

To double-check their contention, extensive wind-tunnel testing was performed on the Super King Air design before metal was cut and then the prototype was subjected to rigorous stall tests. "We've got no problems at all," the engineers told B/CA. "Stalls in this aircraft are entirely conventional in every way." Apparently the FAA agrees. No special stall protection devices will be required for certification.

Tail surface control linkages are conventional cables and push rods. The stabilizer itself is fixed. Trim is via manually or electrically actuated elevator tabs.

As we said earlier, Beech will aim this airplane squarely at the Citation market. Beech's first brochure on the Super King Air flies it (on paper) against the Citation on a 300-nautical mile trip with NBAA reserves. The load included two pilots, five passengers and 210 pounds of baggage. Both these aircraft were cruised at 21,000 feet in standard day conditions.

In the comparison, the Super King Air 200 needed one hour and eight minutes for the flight. When loaded for the trip, the King Air has 1,703 pounds of useful load remaining and requires 1,925 feet to get off and over a 50-foot obstacle. At that reduced takeoff weight (10,797 pounds) the King Air 200 climbs at 3,400 fpm, both engines, 1,050 fpm one engine, and the landing distance required is 2,010 feet.

Those who are familiar with the Citation's numbers for a similar stage length will recognize that the foregoing Beech 200 figures are quite close. But we must stress that these numbers were designed to put the Super King Air in the best possible light, and they serve only to indicate that Beech will be aiming at the Citation market with the Model 200 and that the competition might be pretty stiff if the King Air does in fact perform as well as the preliminary information suggests.

At this writing, Beech was in the midst of an FAA certification flight-test program with the Model 200 and all specifications and performance data were therefore "preliminary." However, it was pretty certain that the weights shown below would be applicable, to production aircraft:

Weights (lb.)	
Ramp	12,590
Max takeoff and landing	12,500
Max zero fuel	10,400
Typical equipped empty	7,650
Typical useful load	4,850

The Super King Air's ramp, takeoff and landing weights all are about 1,000 pounds more than allowed for the King Air A100. However, the equipped empty weight of the 200 is only about 500 pounds more than the A100.

Operating speeds have been increased substantially in the 200 compared with the A100. V<sub>mo</sub> is 270 knots compared with 226 knots; approach flap speed is 200 knots compared with 182 knots, and full flap speed is 142 knots compared with 140 knots. The Model 200's gear can be lowered at 182 knots compared with the A100's gear extension limitation of 156 knots, and the gear retraction limit of the 200 has been set at 160 knots compared with 130 knots for the A100.

Preliminary engineering data indicates the 200 will climb at 2,520 fpm at maximum gross weight in standard day conditions. Service ceiling is 32,300 feet. The A100's rate of climb under the same conditions is 1,963 fpm. The King Air 200 will climb at 810 fpm on one engine at sea level ISA at maximum gross weight. Single-engine service ceiling is 19,000 feet at maximum gross weight.

The Model 200's maximum cruising speed will be about 290 knots, according to its designers. Normal cruise will be about 278 knots. Range at maximum cruise power (45-minute reserve) is anticipated to be 1,482 nautical miles. Range at economy power (max cruise range) is expected to be 1,779 nautical miles under the same conditions.

Price of the Super King Air will be above \$745,000 fully equipped with interior and King avionics. That price tag is about \$100,000 higher than the King Air A100 and about \$20,000 higher than a comparably equipped Citation. The standard avionics package includes dual transceivers, nav receivers, glide-slope receivers, a single ADF, marker-beacon receiver, DME and transponder (all King Gold Crown), Collins flight-control system and RCA weather radar.

By the end of this month Beech will have finished the FAA test-Right program leaving only final paper work to be accomplished before the FAA grants certification. That is certain to come before year's end. First customer delivery is set for February 1974. No production schedule had been set at this writing. Early next year B/CA will evaluate the Super King Air 200 under our standard analysis format. B/CA