Pilot Flight Check:

BEECHCRAFT Super King Air

T-tail twin carries nine at over 300 mph and keeps costs down while doing it

by BARRY SCHIFF / AOPA 110803

■■ Until a few years ago, the airlines and other turbine-aircraft operators were paying as little as 11 cents for a gallon of kerosene. But, in an unexpected flash of history, bargain-basement fuel prices vanished forever.

Fuel consumption had been a relatively unimportant factor when considering the purchase of a new vehicle, but OPEC changed all that. As a result, large cars are yielding to small ones, and pure-jet aircraft find themselves competing against the slower, but less "fuelish" turboprops.

This partially explains why many aircraft purchasers are willing to pay $898,500 for a Beech Super King Air 200 when some of the less expensive business jets sell for very little more. For it is after the purchase is made that the economic curves often bend in favor of the turboprop, especially when stage lengths aren't particularly long.

Beech's T-tailed entry, for example, carries nine people on a 500-nm flight while burning only 156 gallons of kerosene in the process. This results in a fuel consumption of 33 passenger-miles per gallon. Small business jets, on the other hand, do not approach this level of fuel economy.

The pure jet aircraft is, of course,

Super King Air cabin is extremely quiet, seats 9–12 depending upon interior configuration. The 6-psi pressurization system limits cabin altitude to 6,700 feet at FL 250.

BEECHCRAFT SUPER KING AIR 200

Specifications

Engines	2 P&W PT6A-41, 850-shp each
Propellers	2 constant-speed, full feathering, reversible
Wing span	54 ft 6 in
Length	43 ft 9 in
Height	15 ft
Wing area	303 sq ft
Wing loading	41.3 lb/sq ft
Passengers and crew	9–12
Empty weight	7,315 lb
Maximum zero-fuel weight	10,400 lb
Useful load	5,275 lb
Gross weight	12,500 lb
Power loading	7.4 lb/hp
Fuel capacity	544 gal (usable)
Baggage capacity	53.5 cu ft

Performance

Takeoff over 50-ft	2,580 ft
Rate of climb	2,450 fpm
Single-engine rate of climb	750 fpm
Maximum cruise (15,000 ft)	333 mph
Normal cruise (25,000 ft)	314 mph
Maximum range (131,000 ft, 45-min reserve)	2,172 sm
Service ceiling	32,800 ft
Single-engine service ceiling	19,150 ft
Maximum certificated altitude	31,000 ft
Stall speed (clean)	117 mph
Stall speed (flaps down)	92 mph
Landing over 50-ft (without reversing)	2,845 ft
Base price	$898,500

Beech Super King Air 200 cruises 333 mph, covers 500-nm stage lengths at slightly slower speeds but on much less fuel than pure jets. Not just an aesthetic touch, T-tail greatly reduces need for trim adjustment during flap changes.

significantly faster, but on a 500-nm flight, the difference in flight time is on the order of 20–30 minutes. The prospective buyer must determine how much extra fuel he is willing to burn to save half an hour en route.

On longer flights, the pure jet's superior speed pays increasingly more significant dividends. But this is not to imply that the Super King is a slowpoke. A maximum cruise speed of 333 mph (at 15,000 feet) makes it the second fastest turboprop on the market. (The Mitsubishi MU-2M has a maximum cruise speed of 350 mph.)

There are other turboprop advantages. These aircraft are not banned from certain noise-sensitive airports, and a turboprop can be flown by a single pilot; jets must be operated by a crew of two. And because the Beechcraft Super King Air tips the scales at only 12,500 pounds, the lone pilot is not required to seek a type rating from the FAA. Jets, on the other hand, require a type-rated captain irrespective of maximum gross takeoff weight. These factors contribute further to the relatively low cost of operation for a light, turboprop twin.

Certainly these are some of the reasons that account for the popularity of the Model 200. More than 125 of them have been delivered since the aircraft was introduced a year and a half ago. The Super King Air is in such demand that buyers must wait nine months to get a new one.

Other features of the relatively new aircraft are comfort, an extremely quiet cabin, extraordinary stability, excellent control response and beauty. There's no denying that the T-tail gives the Super King Air a long, lean, aesthetically pleasing profile.

But the lofty horizontal stabilizer (it's 15 feet above the ground) serves more than cosmetic purposes. Since it is well above the downwash of the wing, flap deployment and retraction results in the need for very little trim correction. (Each of the dual elevators has its own trim tab.)

T-tails are often associated with high-performance jet aircraft and the reputedly hazardous "deep stall." Even though such a condition is almost impossible to induce in an aircraft with an unswept wing, I was naturally curious to see if this was true of the Model 200, which has a straight, tapered wing. Absolutely. During stalls with various flap/power combinations, the aircraft never misbehaves and remains totally controllable at all times.

Without going into a lot of colorful adjectives, the Super King Air's flight characteristics are easily summed up as being simply marvelous; it's an easy

airplane to maneuver. The only flight characteristic likely to catch the uninitiated off guard is the airplane's extraordinarily efficient elevators. These create a tendency to overcontrol slightly in pitch during the landing flare when only a small amount of elevator back pressure is needed. After a few touch-and-go's, however, the adjustment to this becomes automatic.

The Super King Air is easy to land, but not initially easy to land smoothly. The aircraft tends to touch down stiff-legged until you get used to it. Otherwise, handling qualities are pleasant and predictable.

My only complaint is a minor one. The electric elevator trim moves too slowly and doesn't relieve elevator forces quickly enough during periods of massive power and/or speed changes. At such times, the manual trim wheel is much more useful. Initially, Beech designed a faster-acting trim, but FAA rejected this during certification, fearing that a fast-moving runaway trim would be too difficult for a pilot to control. Frankly, this thinking is hard to understand because of the easily accessible cut-out switches that can be used almost instantly to deactivate the electric trim.

Prior to flying the Super King Air, I had ample time to study the flight manual. Pilots generally complain about an inadequate handbook but aren't as quick to offer deserved praise—this one deserves it. With the exception of the manuals provided to airline crews, I've never seen one so thorough and easy to use.

The manual is so extensive as to include a thick, special performance section to provide data to Model 200 operators who opt to equip their aircraft with high-flotation tires for use on unimproved fields. These are wider than the standard, high-pressure tires and don't quite fit into the wheel wells. The special charts compensate for the additional drag and show, for example, a loss of 4 mph TAS when in cruise flight at 16,000 feet.

The performance data is accurate too. During my first flight in N925B, cruise data was obtained at 16,000 and 31,000 feet (maximum allowable ceiling) to compute true airspeeds of 320 and 288 mph, respectively. Book values are 321 and 287 mph. Actual fuel consumption figures at these speeds were 780 and 460 pounds per hour respectively and are within 1% of published values.

Prior to departure, the performance charts were consulted to compute the time and distance required to climb to FL 310 where the temperature was reported to be standard (−47°C). The heavily loaded King Air 200 performed as advertised and made the ascent in 28 minutes while covering a ground distance of 104 sm. A by-the-book descent consumes 21 minutes and 93 sm.

These figures are especially interesting when they're combined. The total time required for climb *and* descent is 49 minutes and covers a total distance of 197 sm. This results in an average, no-wind ground speed of 241 mph. Since recommended cruise airspeed at FL 310 is 287 mph, this results in a difference of only 46 mph between the overall climb and descent and cruise, a tribute to the aerodynamic efficiency of the airplane.

At the maximum allowable gross weight of 12,500 pounds, the Super King Air has a 2,450-fpm climb rate at sea level that decreases slightly to 2,350 fpm at 5,500 feet and then linearly to 225 fpm at FL 310. Single-engine climb performance at max gross is outstanding—740 fpm at sea level.

It is customary to refer to airspeed during a normal climb in smaller aircraft, but not so in rapid-climbing turboprops. At low altitude, an initial climb is *established* in the Super King Air at 160 knots IAS, at which time the pitch angle on the artificial horizon should be noted. This attitude should then be maintained throughout the remainder of the climb. This technique is considerably easier and more efficient than chasing the steadily decreasing indicated climb speed and also is more comfortable for the passengers in the rear of the long cabin who are most aware of pitch changes.

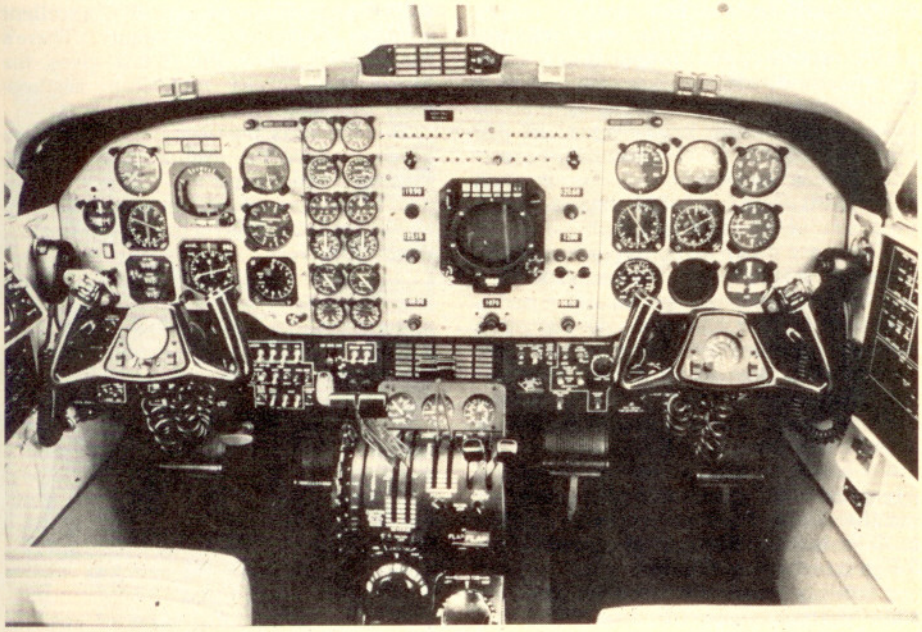
Throughout the climb, cabin pressurization is an automatic function so long as the controls have been preset properly. The Super King Air's 6-psi system maintains a sea-level cabin up to 13,800 feet, a 3,800-foot cabin at 20,000 feet and a comfortable 6,700 feet at FL 250. At 31,000 feet, cabin altitude is 9,800 feet. Airflow through the pressurization system results in a complete cycle of cabin air every two-and-a-half minutes thereby maintaining a fresh, clean environment.

Relative to weight and balance, it is noteworthy that although the gross weight is limited to 12,500 pounds, this was done apparently to simplify crew requirements. The aircraft was designed to be flown at much heavier weights as evidenced by the Army, which operates its Super King Airs at 15,000 pounds.

The center-of-gravity envelope is large and allows considerable loading flexibility, an advantage gained, in part, by the utilization of a T-tail.

The basic empty weight is 7,315 pounds which, when deducted from the zero-fuel weight of 10,400 pounds, allows a maximum fuselage load of 3,085 pounds. All weight above 10,400 pounds must consist of fuel. Maximum usable fuel is 544 gallons (3,645 pounds).

For those not familiar with "zero-fuel weight," this is a limitation found in heavier airplanes and is derived to pro-



While this "loaded" King Air 200 panel is equipped for two-pilot operation, the 12,500-pound gross weight turboprop can be flown by a single pilot. Flight characteristics were rated as excellent, although quick elevator response took some getting used to.

tect the wing-root structure. Since the force of lift exerts an upward pull on the wings and the force of gravity exerts a downward pull on the fuselage, this causes a wing-bending moment. To prevent this moment from becoming excessive, the fuselage in this case is limited to a payload of 3,085 pounds. Additional useful load (up to a maximum of 5,185 pounds) must be fuel (that goes in the wings). This is not meant to imply a weakness in the structure of the Model 200; quite the opposite is true. This limitation is common to all large airplanes including transport-category jetliners.

The Super King Air is a "go anywhere, go anytime" airplane and is certificated for flight into known icing conditions. The engine inlet ducts are heated with exhaust gas; an engine oil heat exchanger automatically heats fuel to prevent ice crystals from collecting in the fuel controller; pneumatic fuel-control lines are wrapped in electrically heated blankets; and the fuel tank vents, which are situated in such a way as to preclude the possibility of icing, are provided with electrical heating in case the impossible becomes possible.

Inertial separators (a pair of movable deflectors located in the intake ducts) prevent the engine inlet screens from choking with ice. These separators can also be used during operations on unimproved runways and taxiways to prevent the engines from ingesting foreign objects.

The inertial separators led to my only complaint about the flight handbook. The use of these devices taps engine power and robs airspeed, but nowhere in the book could I determine the overall effect of this on performance, which could be in the range of 5–10%. After inquiring, I learned that most Super King Air pilots avoid this situation by climbing above 25,000 feet, where icing is rarely a problem and the inertial separators can be safely retracted.

The windshields are electrically heated; the leading edges of the wings and horizontal stabilizers are protected with electro-pneumatic boots, and both pitot masts and propellers are electrically heated. To prevent damaging the heating elements on the propellers, a timing device alternately routes electrical current to each propeller for only 30 seconds at a time, which is sufficient to protect the blades during the worst conditions.

The aircraft is also well suited to the varying demands of air traffic control. Because of relatively high landing-gear and flap speeds (209 and 230 mph, respectively), this sleek machine can slow down in a hurry and fly the pattern with slower, single-engine aircraft.

When the original Model 90 King Air was introduced 12 years ago, it was difficult to imagine how the basic design could be substantially improved. But it has been. The Super King Air is a super airplane and an outstanding example of a family of superior aircraft. □