



BY PETER A. BEDELL

Do you think Walter Beech expected his postwar Bonanza design to fly into the twenty-first century? It's doubtful. Yet here it is 53 years after its certification, albeit a vastly different airplane, getting a new lease on life. Boosted by a good economy, Bonanza sales are better than they've been in decades. The tradition of speed and quality construction is still there, but those virtues have been supplemented by modern technology. In fact, Raytheon has made more obvious changes to its Beech line of piston airplanes in the past two years than it has in the last 15 years.

New avionics and a stylish paint and interior package take the Bonanza into the twenty-first century

PHOTOGRAPHY BY MIKE FIZER



In 1999, Raytheon incorporated the new Continental Special Edition engine—basically a rebadged Continental Platinum engine—in its Bonanza and Baron models. The new engines brought newfound smoothness and power to the airplanes and—over time, hopefully—increased reliability. Also for 1999, Raytheon made the switch to AlliedSignal's Bendix/King Silver Crown Plus line of avionics, which included the new KX 155A navcoms and the KFC 225 autopilot (see "Pilot Products," June 1999 *Pilot*).

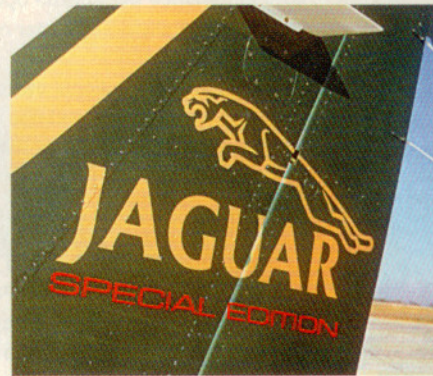
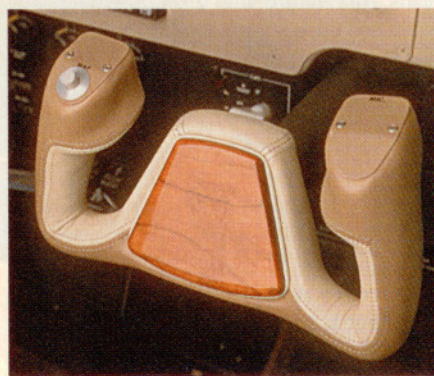
With the under-cowl and instrument panel changes accomplished (for the moment at least), Raytheon turned its attention to the interiors of the popular Bonanza and Baron series. Raytheon teamed with luxury auto manufacturer Jaguar in 1998 to create the successful Jaguar Special Edition C90B King Air. Using Jaguar-approved materials and designs, Raytheon created stunning interiors for the King Air. On the outside, a distinguishing paint scheme with the Jaguar "Leaper" logo let others know that this was no ordinary King Air.

Raytheon believed that the Jaguar

marriage would be even more successful when tied to its Beech line of piston-powered airplanes, which are more likely to be bought by individuals looking for a more personal touch. For the buyer, the Jaguar partnership brings luxury and personality to a select batch of Raytheon's piston airplanes. For Raytheon, the Jaguar partnership provides access to a new market. This promotional cross-pollination of sorts meant that Raytheon airplanes or mockups would appear where Jaguar had displays, such as golf tournaments and equestrian events. Last year, a Bonanza (less one wing) was touring the country on a trailer heading to such events. Likewise, Jaguar cars will be displayed at Raytheon's exhibits at aviation-related events. The \$15,000 Jaguar option will be applied to a select batch of Beech airplanes in 2000.

Also new for 2000, Raytheon—like many other manufacturers—has accommodated its customers' demand for the all-in-one Garmin GNS 430, the IFR-approved GPS and navcom with a built-in moving map. For redundancy, the company has incorporated two of

these units in its standard avionics package to offer the ultimate in situational awareness. By the third quarter, Raytheon hopes to offer the large-display Garmin 530 in place of one of the 430s. The Garmins now display lightning activity right on the moving map, thanks to an interface with a BF Goodrich WX500 remote Stormscope sensor. Previously, Raytheon airplanes were not available from the factory with a Stormscope. Shadin's ADC-200 air-data computer is also remotely installed to provide air data such as true airspeed and winds aloft. A neat feature is a wind vector arrow with the velocity displayed on the GNS 430's moving map. Features like this are usually found only on high-end business aircraft. Finally, the two Garmins have a crossfill feature that allows flight plan information from one unit to be automatically entered into the second one. And, despite the added capability, the Bonanza actually loses about five pounds. A full stack of AlliedSignal Bendix/King avionics is available on the Beech options list. ADF, DME, and—for the Baron only—weather radar are still



supplied by AlliedSignal.

Topping off the stack of Garmin and AlliedSignal avionics is PS Engineering's PMA7000 audio panel/six-place stereo intercom. The PMA 7000 offers split com, a function that allows the pilot and copilot to communicate on separate radios while still talking to each other. Two music inputs allow the kids in the rear of the airplane while the parents up front can enjoy Bach and Brahms, all while still being able to communicate with each other if desired.

Although a lot of brands are represented in the Bonanza's avionics stack, the appearance is not hodgepodge. More than anything, it shows that Raytheon is listening to customer demands.

All piston-powered Beech airplanes are available with the Jaguar option, and we chose a B36TC as our steed for evaluation. The turbo Bonanza has the same wing as the twin-engine Baron, which spans nearly 38 feet—4.5 feet more than the normally aspirated A36. Most importantly, the increased wingspan allows the B36TC to carry 102 gallons of usable fuel—28

The Jaguar Special Edition features a distinctive paint scheme complete with British racing green. On the inside, the seats are modeled after those found in the Jaguar Vanden Plas luxury car. Figured cherry wood inserts accent the tasteful interior as do leather-covered yokes.

gallons more than the A36. Side benefits of using the longer wing are improved climb rate, lower stall speed, and better performance at high altitudes. The crisp roll rate associated with Bonanzas is numbed slightly by the longer wing, but the difference is barely noticeable in everyday flying. The overall handling is still sports-car-like compared to that of the competition—a Bonanza trademark.

An automatic wastegate controlled by a variable absolute pressure controller allows the pilot to simply advance the throttle to the stop on takeoff without worrying about overboost during a critical phase of flight. Rolling takeoffs are a sluggish affair until the turbo kicks in, so if runway length is tight, hold the brakes and bring the power up to at least 30 inches of manifold pressure before releasing the binders.

With three adults, about 80 gallons of fuel, and some baggage on board, we weighed in a few pounds shy of the air-

plane's maximum gross weight of 3,850 pounds. At that weight, we saw an initial climb rate of 1,000 feet per minute. Cruise climbing at 34 inches and 2,600 rpm resulted in 800 fpm at 125 KIAS. In the climb, cylinder head temperatures were about 440 degrees Fahrenheit while oil temp reached 205 degrees F on this warm test day. Fuel flow was about 28 gallons per hour. Raytheon suggests that on really warm days, the pilot should use 130 to 140 KIAS in cruise climb to keep the engine cool. It may also be necessary to use low boost on the two-position fuel pump to purge any vapor that forms in the fuel system after climbing from warm conditions into frigid temperatures. After starting at a field elevation of 1,400 feet, we passed through 10,000 feet in 12.5 minutes. Passing through the critical altitude, where the wastegate was completely closed and power began to decrease with altitude, we noted a 166-knot true airspeed in the now 500- to 600-fpm climb. On this warmer-than-

Raytheon's plans for the next millennium

Raytheon Aircraft Company (RAC) has become perhaps the most diverse airplane manufacturer in the world. From the legendary Bonanza to the Hawker 800XP, Raytheon has the GA market well covered. But Raytheon has become more than just a manufacturer of GA and business airplanes.

A few years back, Raytheon was awarded the multi-billion-dollar joint primary aircraft training system (JPATS) contract that over the next several years will provide the U.S. Navy and Air Force with hundreds of T-6A Texan II primary trainers (see "JPATS: This Is Not Your Father's T-6," August 1997 *Pilot*). RAC also builds a number of special mission or trainer versions of the King Air, Beechjet, and Hawker 800 business jets, and supplies them to U.S. and foreign militaries and research companies.

Then there is the network of Raytheon Aircraft Services (RAS) FBOs. These facilities provide general line service as well as maintenance and service throughout the United States and the United Kingdom. In October, RAS branched out to Central America and opened Raytheon Aircraft Services-Mexico at the Toluca International Airport just west of Mexico City. There, RAS is partnering with Aerolineas Ejecutivas, a Raytheon dealer since 1993 that will continue to provide 24-hour line service as well as an aircraft sales office at the facility. RAS will become partners with Aerolineas Ejecutivas in the factory-authorized maintenance side of the operation. This partnership gives Raytheon a service foothold that will allow it to better maintain and supply parts to aircraft south of the border.

As most of us are aware, fractional ownership of airplanes has become quite a lucrative business. Instead of playing spectator, Raytheon jumped on the bandwagon in 1997 and created Travel Air. Using King Airs, Beechjets, Hawkers, and the new Horizon and Premier (when they become available), Travel Air has experienced explosive growth. By 2004, the service is expected to consist of 180 airplanes and 1,000 shareholders.

For those of us who are current owners of Beech airplanes, the company is promising improved service in the replacement-parts arena. The Raytheon Aircraft Parts Inventory and Distribution (RAPID) Company is in the midst of moving its facility from Salina, Kansas, to the Dallas/Fort Worth Airport (DFW). When completed at the end of the first quarter, the move is expected to speed up delivery of new parts because of DFW's central location and 1,500 daily flights to all parts of the world. In fact, parts

orders received by 2 p.m. can be shipped out the same day. In some cases, domestic receipt can be possible in as little as four hours.

RAPID is also trying to reverse the reputation of Beech parts as being overly expensive; in the past two years it has reduced the prices on 73,000 parts.

On the technology side, Raytheon is breaking new ground in the arena of composite airframes. Although the Beech Starship project of the 1980s was a failure as far as sales were concerned, it put Beech (now Raytheon) light-years ahead of the competition in building and certifying composite airframe parts.

Today, Raytheon is working full steam on the Premier I and Hawker Horizon business jets. Both airplanes' fuselages are entirely composite, which makes a better-sealing pressure vessel as well as a thinner, yet stronger shell that leaves more elbow and headroom for those in the cabin.

Raytheon has the technology to pursue development of a small composite fuselage that would allow for low-cost, lightweight, pressurized fuselages. One of the most common questions asked regarding the Beech B36TC Bonanza concerns its lack of pressurization. Beech had a similar pressurized fuselage on the 58P Baron, but it would be too heavy for the Bonanza to be practical. With Raytheon's composite experience, however, the weight and cost could be kept low enough to make a new pressurized-single design practical. There's no official word on when Raytheon might pursue such a venture, but the company certainly has the technology to introduce an all-new light composite airplane. —PAB



The Premier I is forging new ground in composite airframe construction.



The extensive standard avionics package brings added capability yet reduced weight to the B36TC. Included are three-axis autopilot, ADF, DME, and dual IFR GPS mapcoms.

standard day the critical altitude was 19,000 feet. Forty-five minutes after takeoff, with a brief level-off for traffic, we were cruising at Flight Level 250.

At the maximum cruise power for that altitude (31 inches and 2,400 rpm), the B36TC maxed out at 201 KTAS on 17.5 gallons per hour at ISA-plus-10 conditions. The TC's high-altitude performance is as speedy as a normally aspirated Baron on slightly more than half of the fuel burn. Cabin noise level was 86 dBA in the front seats and 82 dBA in the rear cabin area. The soundproofing used in the new Bonanza coupled with the muffling effect of a turbocharger make the use of headsets an option rather than a requirement in the B36. Still at FL250, we set 24 inches and 2,300 rpm and the TC turned in 170 KTAS on 13 gph.

Since the TC is unpressurized, we were using the airplane's on-board 98-cubic-foot capacity oxygen system, which consists of two supply tanks (one mounted in each wing). The pilot needs only to pull the oxygen knob to the On position—flow is automatically regulated based on the airplane's



altitude. For those pilots and passengers not willing to strap on an oxygen mask, you can expect the B36 to achieve 171 KTAS on 16 gph at 11,000 feet. From 11,000 feet, we simulated an emergency descent and had the airplane coming down at 2,700 fpm with the gear and approach flaps out. In the flight levels, that descent rate would be better thanks to the thin air, meaning that the B36 can descend from FL250 to a breathable altitude in about 4.5 minutes or less.

For turbocharged airplanes, an altitude alerter is a real asset. The B36TC's AlliedSignal KFC 225 autopilot has one built in and makes those long climbs and descents a more relaxed affair by providing warnings 1,000 feet prior to the target altitude. If you stray more than 200 feet from the target altitude, another warning is given. If the autopilot is flying the airplane, you can program a target vertical speed and the system will gently capture the altitude you set. The KFC 225 provides the precision of an attitude-based autopilot with the smoothness of a rate-based autopilot.

Descending into our destination airport, we encountered some turbulence, which reminded me of an often-overlooked advantage of Bonanzas—the air-

2000 Raytheon Beech Bonanza B36TC

Base price: \$606,670 (estimated)

Price as tested: \$642,580 (estimated)

Specifications		
Powerplant	300-hp Continental TSIO-520-UB	Maximum level speed, 25,000 ft 200 kt
	Recommended TBO 1,600 hr	Cruise speed/endurance w/45-min rsv, std fuel (fuel consumption)
Propeller	Hartzell three blade, constant speed	@ 75% power, best power 200 KTAS/4.9 hr
	78 in dia	25,000 ft (99.6 pph/16.6 gph)
Length	27 ft 6 in	@ 65% power, best economy 195 KTAS/5.4 hr
Height	8 ft 7 in	25,000 ft (94.2 pph/15.7 gph)
Wingspan	37 ft 10 in	@ 55% power, best economy 162 KTAS/7.4 hr
Wing area	188.1 sq ft	25,000 ft (67.2 pph/11.2 gph)
Wing loading	20.5 lb/sq ft	Maximum operating altitude 25,000 ft
Power loading	12.8 lb/hp	Service ceiling 25,000 ft
Seats	6	Landing distance over 50-ft obstacle 1,692 ft
Cabin length	12 ft 7 in	Landing distance, ground roll 976 ft
Cabin width	3 ft 6 in	
Cabin height	4 ft 2 in	
Empty weight	2,740 lb	
Empty weight, as tested	2,845 lb	
Maximum ramp weight	3,866 lb	
Maximum gross weight	3,850 lb	
Useful load	1,269 lb	
Useful load, as tested	1,021 lb	
Payload w/full fuel	657 lb	
Payload w/full fuel, as tested	409 lb	
Maximum takeoff weight	3,850 lb	
Maximum landing weight	3,850 lb	
Fuel capacity, std	108 gal (102 gal usable)	
	648 lb (612 lb usable)	
Oil capacity	12 qt	
Baggage capacity	(aft) 400 lb, 37 cu ft	
	(extended aft) 70 lb, 10 cu ft	
Performance		
Takeoff distance, ground roll	1,156 ft	
Takeoff distance over 50-ft obstacle	2,364 ft	
Max demonstrated crosswind component	17 kt	
Rate of climb, sea level	1,053 fpm	
		Limiting and Recommended Airspeeds
		V _x (best angle of climb) 77 KIAS
		V _y (best rate of climb) 100 KIAS
		V _A (design maneuvering) 141 KIAS
		V _{FE} (max flap extended) 154 KIAS
		V _{LE} (max gear extended) 154 KIAS
		V _{LO} (max gear operating) 154 KIAS
		V _{NO} (max structural cruising) 168 KIAS
		V _{NE} (never exceed) 206 KIAS
		V _R (rotation) 70 KIAS
		V _{S1} (stall, clean) 65 KIAS
		V _{SO} (stall, in landing configuration) 57 KIAS

For more information, contact Raytheon Aircraft Company, Post Office Box 85, Wichita, Kansas 67201; telephone 316/676-5034; or visit the Web site (www.raytheon.com/rac).

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.



The B36TC is spotted by its lack of cowl flaps, single exhaust stack, and longer wings. The large scoop on the side of the cowl is the inlet for the heater. Raytheon recently switched to Hartzell propellers for all of its prop-driven airplanes from the Bonanza to 1900D airliner.

plane's certification in the Utility category. Utility-category airplanes have met structural requirements that are 15.5 percent higher than those certified in the Normal category. This does more

than buy you peace of mind when turbulence is encountered; it also allows the Bonanza to have a high turbulent-air-penetration speed of 141 kt indicated. At higher altitudes, that's at or

above the airplane's indicated airspeed in cruise. Airplanes certified in the Normal category typically suffer from low turbulent-air-penetration speeds that require the pilot to slow to dismally low airspeeds to avoid overstressing the airframe.

Along the same lines, Bonanzas have always had comparatively high landing-gear-operating/extended speeds (V_{LO} and V_{LE} , respectively), allowing the airplane to peacefully coexist with jets and air traffic controllers who are attempting to squeeze a diverse batch of tin onto one busy runway. Being able to maintain 150 kt or better to the middle marker is a big advantage in such airspace. The gear structure is the same as that used on the Baron, whose max landing weight is 1,550 pounds heavier than the B36TC's.

The turn-of-the-century Bonanza has kept the best of its ancestor's traits, yet includes improvements that allow it to fly into the twenty-first century in style. Be proud, Walter. □



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