

Fifty Years

BONANZA

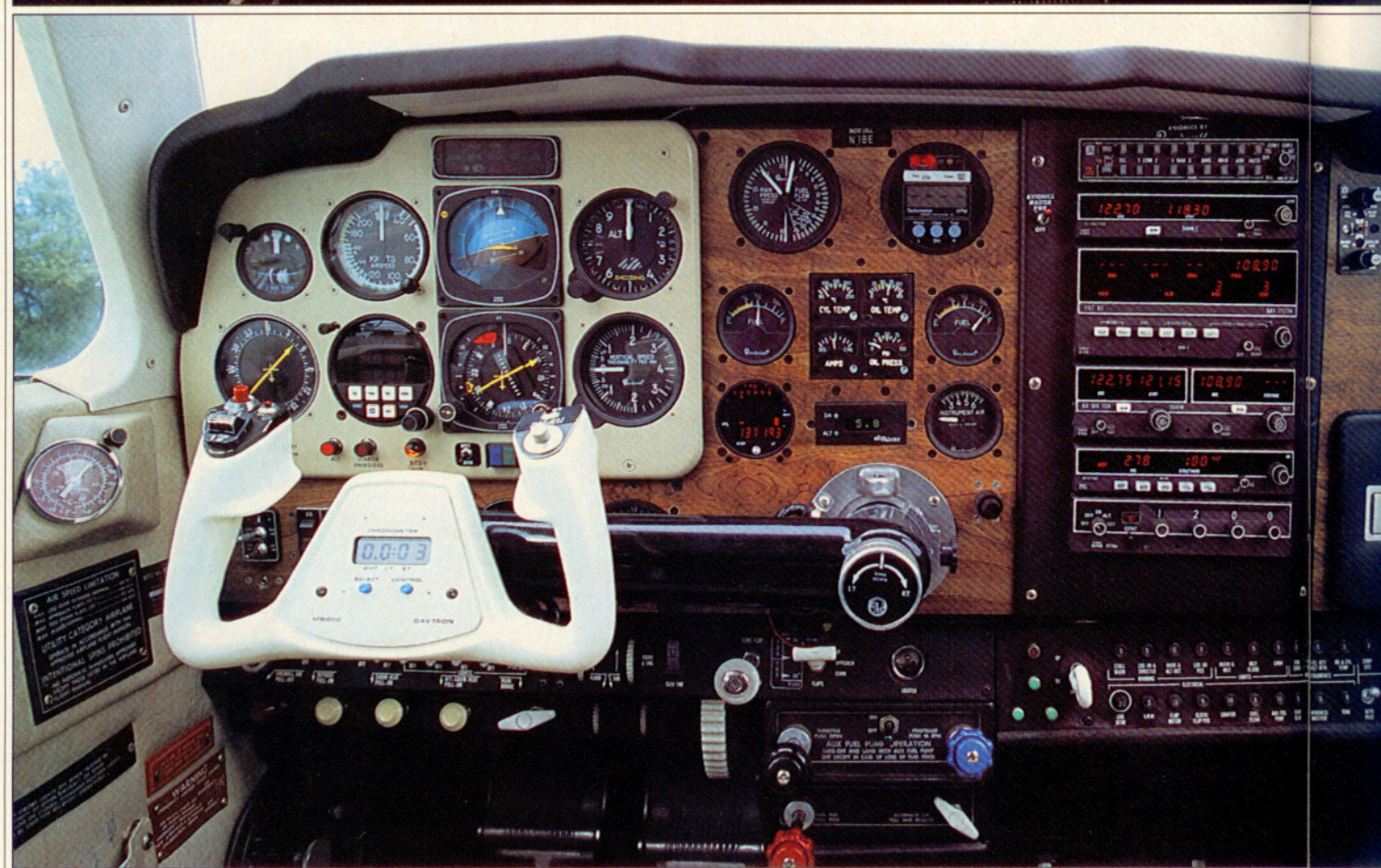
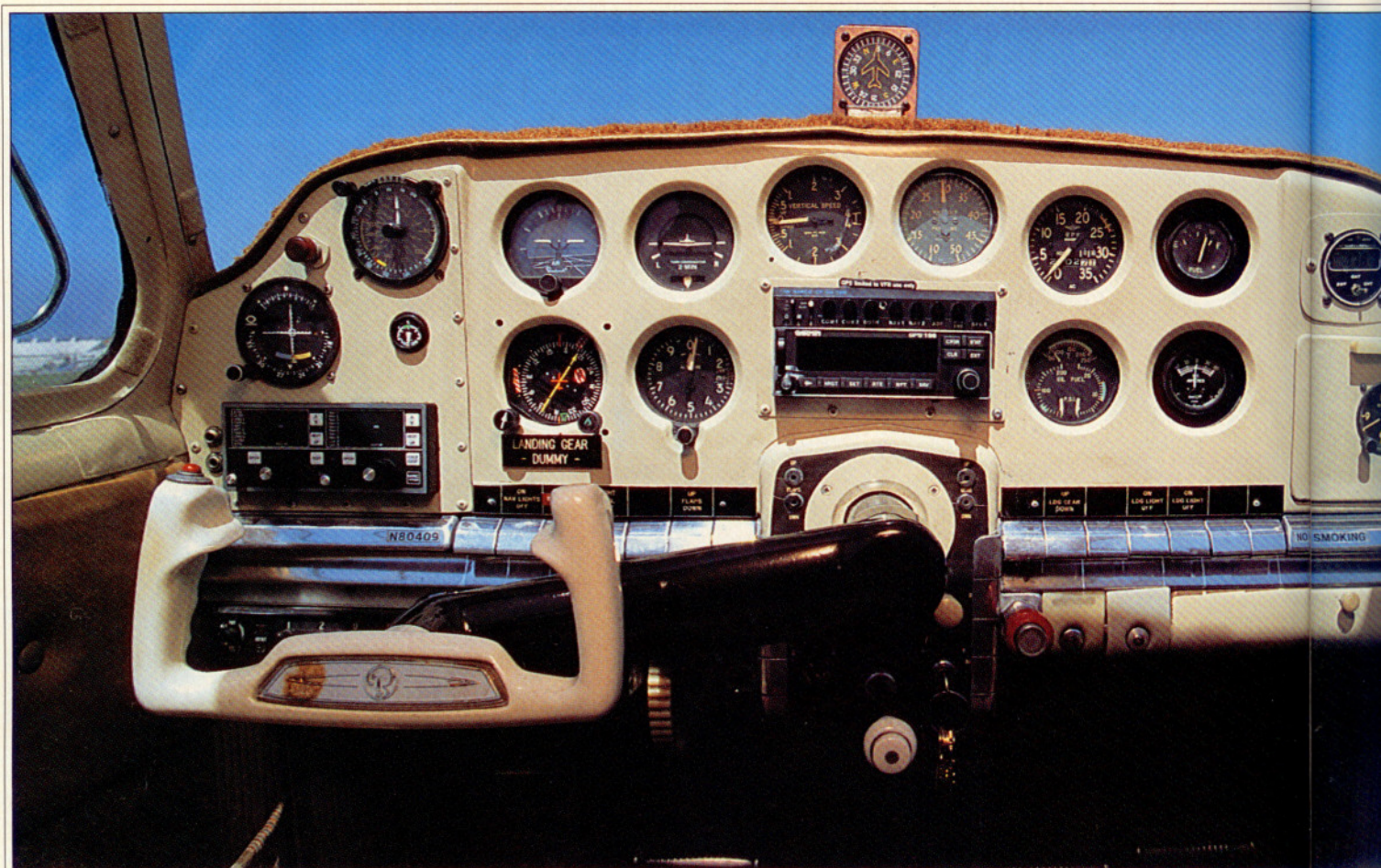
Taking stock of a landmark airplane

BY MARC E. COOK



Fifty years isn't much of a life span for a human or a *Sequoia sempervirens*, but it's a veritable eternity for an airplane. And while aircraft in general enjoy greater longevity than other appliances of man—say, consumer electronics or automobiles—the Beech Bonanza, like the giant redwood, stands well above the others. ■ From the original Model 35 (which first flew on December 22, 1945) to the versions rolling off Beech's—now Raytheon's—assembly lines today, the Bonanza has cut a swath through general aviation like a timeshare salesman through a clutch of snowbirds. It was positioned as the ultimate single-engine airplane at its 1947 introduction and in many respects remains so today. Larry Ball, who worked for Beech in various capacities and wrote two definitive works on the Bonanza, says simply, “Nobody would have guessed at the time that the Bonanza would last 50 years.” ■ Amid the hype of the Bonanza—and over the years there's been plenty of that—one nugget of truth surfaces repeatedly. The Bonanza is a seminal design, capable of performance in delicate mixture that few other airplanes have achieved. Is the Bonanza perfect? Not by a

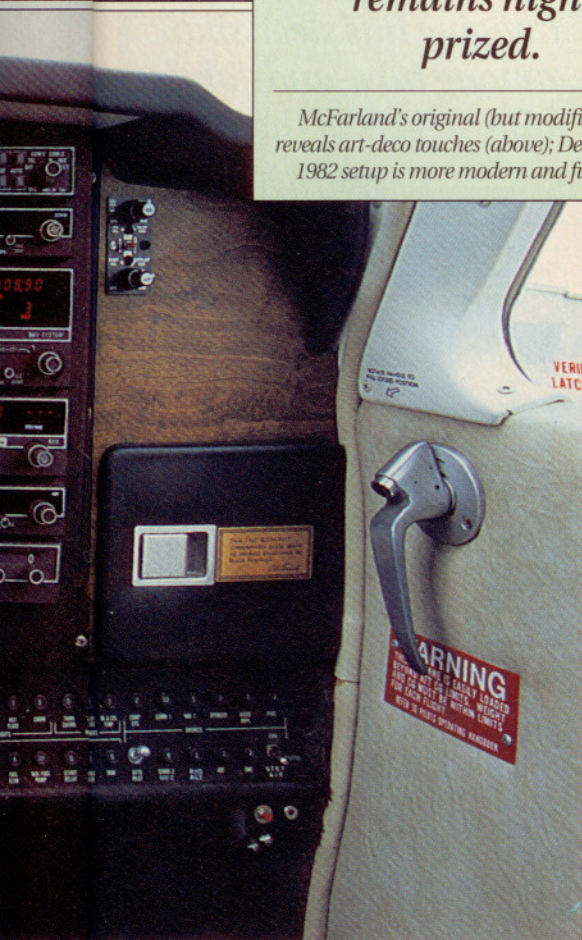
PHOTOGRAPHY BY MIKE FIZER





Fifty years after its first flight, the Model 35 Bonanza remains highly prized.

McFarland's original (but modified) panel reveals art-deco touches (above); Deakin's circa-1982 setup is more modern and functional.



long shot—the V-tail's narrow center-of-gravity envelope confounds owners with big families or lots of luggage, and there's some evidence that the airplane's feathery control responses don't mesh well with all pilots' capabilities in demanding weather.

Still, the airplane is considered highly desirable, and so the fiftieth anniversary of the Bonanza's first flight calls for the popping of champagne corks and back-slapping all around. To get a better feel for where the airplane's been, we rounded up examples of early and late V-tail Bonanzas. The 1947 model we flew, owned by Ed McFarland of Torrance, California, is believed to be the oldest flying "straight" 35 around; it is serial number D-9. Beech stopped the V-tail line at the end of the 1982 model year, and John Deakin's V35B is the next-to-last of the breed to roll off the line, serial D-

10402. His airplane is largely original—save for the elaborate Robertson STOL kit, which provides full-span flaps and outboard spoilers for roll control. The STOL kit was installed within a few hours of the airplane's leaving the factory.

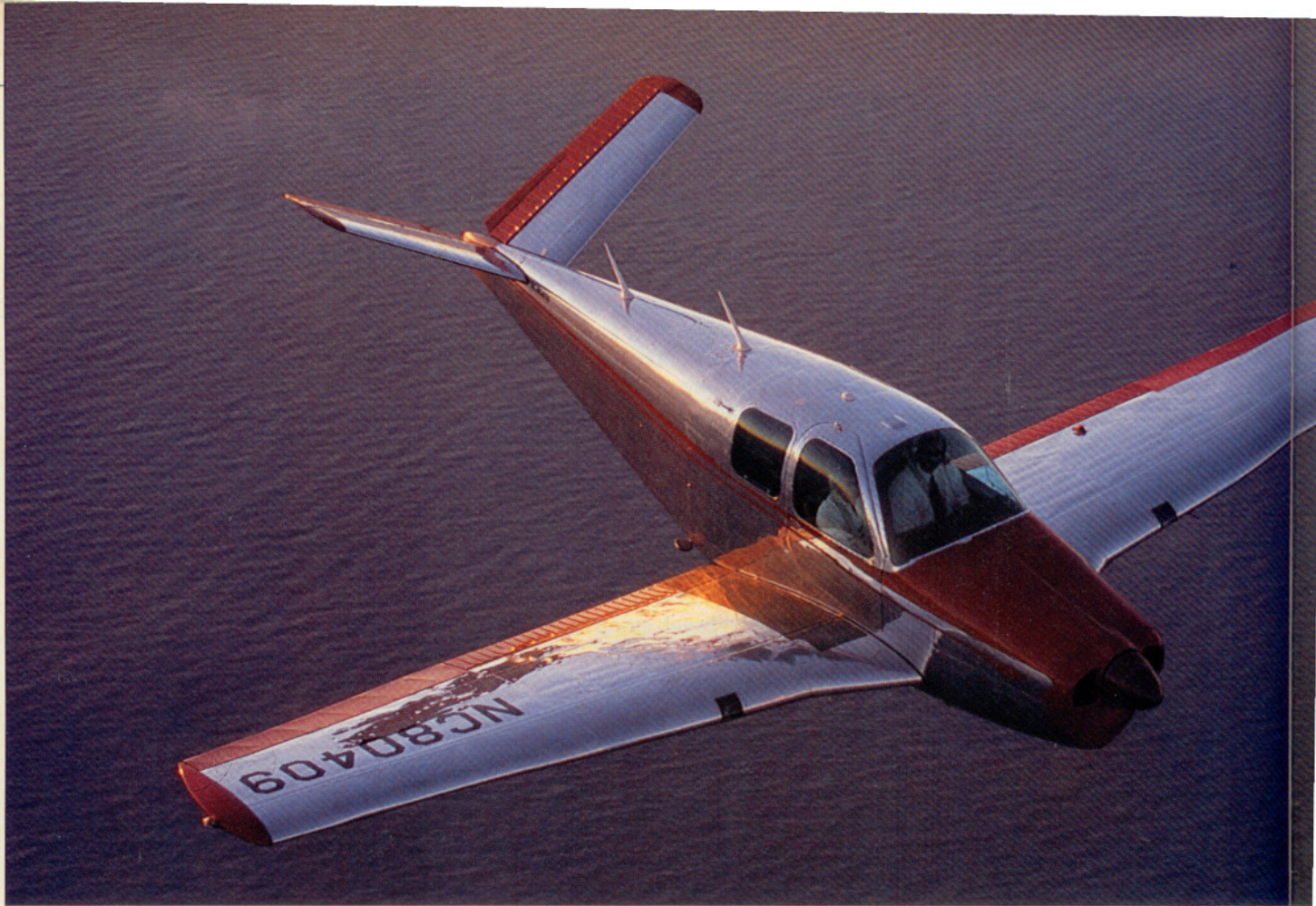
The laundry list of differences between these two airplanes—one at the very beginning of the marque's career, and the other at the end—helps highlight the incredible number of alterations Beech performed over the years. That the airplanes are outwardly similar gives credence to the axiom of not fixing what isn't broken. And yet, under the skin the Bonanza has undergone what amounts to nearly a complete makeover; its major systems all have come in for updates, and even the Bonanza's major structural components have been significantly beefed up over the years. Naysayers—especially those trying to market new-think composite airplanes—like to point to the Bonanza and proclaim, "Look, we're all flying 1930s technology." They say that the airplane hasn't changed much during its long production life, but careful examination discloses otherwise. In addition, the Bonanza's goodness—or Beech's spendthriftness, if you wish—helped it to form the basis of numerous other models, like the mammoth Twin Bonanza, the Baron and Travel Air twins, and the Mentor military trainer.

Even the Duke, Queen Air, and King Air lines owe a great deal to the Bonanza.

To understand the Bonanza, it helps to know something about the period during which it was designed. In postwar America, most aviation companies were staffing up for an expected boom of pilots coming home and demanding new airplanes. During the war, unprecedented research and development in aviation took place, and the state of the art had progressed tremendously since the late 1930s. Walter Beech wanted to take advantage of the knowledge amassed during wartime research and, in particular, to build an aluminum airplane that would be a clean break from the models available before the war and new designs expected to emerge after.

Remember, too, that the predominant general aviation airplane of the prewar era was a two-place, high-wing taildragger. Piper's various Cub derivatives were expected to make a comeback after the war, and word around Wichita was that Cessna had some new, metal designs ready to go—they would emerge as the Cessna 120 and 140 and spawn a lightplane empire in the ensuing decades. From North American, a company heady with the success of its wartime models—the P-51 Mustang, in particular—would come the Navion, full of promise that ultimately went unfulfilled for its lack of speed. Reworked designs from Aeronca, Bellanca, Luscombe, and Taylorcraft were also expected to help to fill the postwar skies, as was the unconventional Ercoupe.

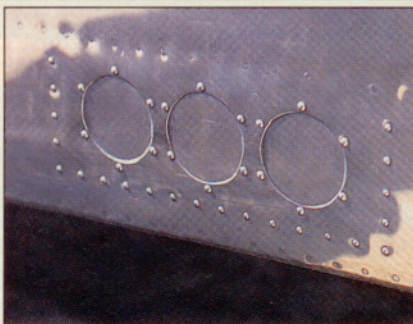
Into this burgeoning marketplace Beech thrust the Bonanza. Distinctive in form and construction, the swift Bonanza offered unmatched-in-class speed and daring good looks. It also embodied some genuinely forward thinking. The tricycle gear, of course, was uncommon at the time. Beech attempted to make it rugged enough to stand up to the many unpaved strips in use then; even the wing's angle of incidence (a lot of it by today's standards) and the gear placement were aimed at making this nosedragger survive cobbly strips. Weight savings were a high priority with the Bonanza, too, leading in part to the distinctive V-tail (called butterfly at the time) and a host of clever engineering solutions to perplexing practical problems. For instance, Beech combined the oil tank and cooler for the dry-sump Continen-



tal, and the hand-powered “wobble” auxiliary fuel pump was made part of the fuel selector assembly.

Beech concocted these solutions in part because off-the-shelf hardware was simply unavailable or too massive for the Bonanza. Also, when Beech called on Continental and Lycoming for possible Bonanza engines, the engineers specified a minimum of 150 horsepower at a maximum of 2,050 propeller rpm; the speed restriction would help increase prop efficiency and reduce noise. (Later, Beech and Continental would abandon that tack in search of more horsepower.)

In addition to its distinctive appearance, Beech believed that the V-tail would save weight and possibly create a bit less drag. Wind-tunnel tests then showed that it was comparable to a three-surface design for stability. Later, the V-tail would become the focus of controversy with regard to the airplane’s structural integrity. (After decades of 35s breaking up in flight, the matter came to a head in 1987 when extensive wind-tunnel time and flight testing revealed that the tail was not up to certification standards in one corner of the airplane’s envelope. Beech had contended all along that



Imagine this sleek shape among tube-and-fabric taildraggers of the 1940s.

The space afforded by the original interior pales next to the accommodations of the later Bonanza. Covered drop-flare holes and trailing-edge stall warning switch mark the 1947 Bonanza.



the 35s broke up when flown outside the normal speed/G-loading limits; the vast majority of the break-ups came from the ranks of the oldest airplanes. Amid much controversy and hand-wringing, Beech introduced a fix in the form of tail reinforcements—a leading-edge cuff for some models, with additional stiffeners for others.)

During 1945, Beech ran parallel development programs on the Bonanza with two engines and two wing planforms. One used a geared, four-cylinder Lycoming GO-290 of 165 hp and a laminar-flow wing similar to the P-51's, and the other carried an un-gearred, 165-hp, 475-cubic-inch Continental six and the old standby NACA 23000 wing. Ironically, it was the Lycoming-powered, laminar-flow airplane that first flew three days before Christmas 1945. In the full year of flight and durability tests that followed, Beech determined that the 23000-series airfoil was nearly a match for the laminar type for sheer speed, but it had other advantages, making it the better all-around wing. Continental got the nod for the powerplant on the basis of delivery schedules, thus beginning a long and profitable association with Beech and the Bonanza.

Flying McFarland's Model 35 today offers insight into what Beech had hoped to accomplish 50 years ago. The airplane is, of course, instantly recognizable as a Bonanza, but several cues tip you off to its age. First, the ailerons are fabric—the flaps used to be, too, but are no longer on McFarland's ship—and the cabin looks tall and not

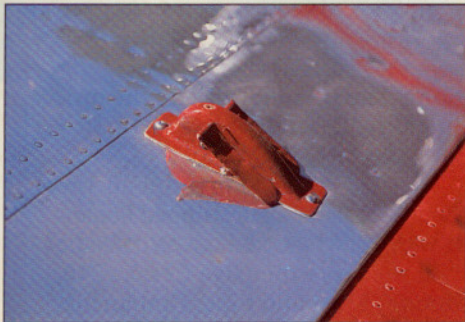
terribly long, especially if you're used to looking at the insides of a later-model Bonanza. A strange vane-type stall warning switch on the left wing ahead of the flap would seem unfamiliar to the new-Bonanza pilot.

Up front, the E-165 looks much like Continental's later big sixes, but the castings are comparatively crude by today's standards. A rare find, McFarland's airplane still carries a wooden Beech electric prop; most have been converted to metal props, and McFarland admits that he flies most trips with alloy blades in place. The pitch-change mechanism is a small electric motor, and this early example also has the somewhat crude constant-speed governor in place and working. Compared to a hydraulic prop, though, the Beech electric is slow to respond and not particularly keen on keeping the engine speed exactly as commanded.

Beyond these idiosyncrasies, old D-9 feels familiar after a few minutes behind the throw-over yoke. Seats close to the instrument panel—and unadjustable—serve to remind us that Americans were smaller in the 1940s; compared to the later Bonanzas, the 1947 model's front row seems a bit cramped. The panel, an art-deco design to the hilt, does a passable job of presenting instruments to the pilot, but the piano-key switches—for gear and flaps, too—require too much of the uninitiated. Styling of these original panels obviously took precedence over function. It wasn't until the P35 of 1962 that Beech finally gave the airplane a more conventional panel.

It's been said many times, but it bears repeating: The original Bonanza is probably the best handling of the lot. Control response and feedback are splendid, and the airplane feels almost sinfully light next to its later, heavier brethren. Indeed, McFarland's airplane carries a maximum gross weight of 2,550 pounds, against a remarkably trim empty weight of about 1,600 pounds. Most well-equipped A36 Bonanzas are heavier empty than a fully laden Model 35.

Thanks to overall low weight and exceptional aerodynamic cleanliness, the original Bonanza is capable of better than 150 knots—and that's using only 63 percent of the Continental's one-minute takeoff rating of 185 hp. In other ways, the airplane performs admirably for the horsepower—climb rate is nearly 1,000 feet per minute at





sea level, and the service ceiling is a whopping 18,000 feet. With 40 gallons of fuel on board—appended by popular baggage-bay aux tanks of 10 or 20 gallons—the early Bonanza has decent range, too.

Those first 40 airplanes constructed in 1947 were essentially hand-built—more so even than the subsequent, still labor-intensive models—and carried the fabric wing control surfaces. Starting with D-41, the flaps and ailerons became magnesium, and a host of refinements were brought to the airplane. You can see evidence on McFarland's Model 35 that the production-test engineers had to try a couple of different locations for the stall strips and stall-warning vane. In the first two years of production, Beech turned out 1,500 35s, a record for the marque, at prices ranging from \$7,975 for the first 973 to \$8,945 for the airplanes up to number 1,500.

Changes came rapidly to the Bonanza after the original 35. In 1949, with the A35, Beech substituted the welded-steel center section—it carries the loads from the wing spars through the cabin—with a sheet aluminum affair. Maximum weight went up, and performance suffered slightly because of it. Beech made 701 A35s. An additional 11 hp for takeoff came with the

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*The V35B encompassed
all the evolution
expected of a 35-year-
long production
run—and more.*

B35, and the rating was upped further still to 205 hp with the C35 of 1951. To compensate for the extra power, the C35's tail had 20 percent greater chord and its dihedral was increased by 3 degrees to help stem some of the airplane's tail waggle in turbulence.

Power from the maturing E-185 continued to increase through the years, and the Bonanza evolved with it. For 1954, the E35 carried 225 hp; and incremental improvements in the airplane's systems, interior, and avionics complement continued through the G35 of 1956. Beech introduced the H35 as a 1957 model, and it was the beginning of a whole new generation of Bonanzas. It had the first of many O-series Continentals—the O-470-G, with a pressure carburetor and 240 hp—that offered a wet-sump oiling system, better cylinders, and a host of other improvements. Simultaneously, the

Bonanza airframe was significantly strengthened in literally hundreds of ways, big and small. With the H35, Beech essentially set the design in stone. The H model was on the production line when Bonanza number 5,000 was sold.

In 1960, Beech introduced the Model 33 Debonair, a stripped Bonanza with a conventional tail, to do battle with the less expensive Cessna 210, Mooney M20, and Piper Comanche. Sharing the 35's cabin and wings, the Deb carried a 225-hp Continental IO-470. It sold reasonably well but hardly made a dent in the more desirable Model 35's popularity.

With the N35 in 1961, Beech introduced larger fuel tanks that substituted two bladders for four and greatly simplified fuel management. An IO-470 of 260 hp came with the change—up 10 hp from the injected Continental given to the J35 in 1958. For the P35 in 1962, Beech finally abandoned the art-house instrument panel for the one that's essentially the same as the current F33A's. Yet more power (285 hp) came with the S35 of 1964; the same IO-520 was given to the C33A Debonair in 1966. Two years later, the Debonair was officially welcomed with the Bonanza moniker.

To make more room for back-seaters



in the S35, the aft bulkhead was pushed rearward 19 inches. While most Bonanza pilots welcomed the additional cabin room, the alteration helped illustrate how the V-tail, once the design's most impressive statement, had come to hinder it. More baggage space spotlighted the restricted center-of-gravity range inherent in the V-tail configuration. Plus, given the fuel tanks' position, the Bonanza's center of gravity moves aft as the trip wears on, further complicating balance considerations.

Beech even installed a pair of kiddie-sized "family seats" in the baggage bay; but unless you carry anvils under the hood, it's unlikely that the occupants can be very heavy without shooting out the aft end of the weight and balance chart. More to the point: The Bonanza's light pitch forces make for a wonderful-handling airplane at a forward center of gravity but something of a handful at the aft limit.

John Deakin's V35B anchors the end of the line and shows all the incremental improvements. The engine is the smooth Continental IO-520, whose foibles include cases that sometimes crack and cylinders that aren't always in it for the full run to TBO. Many owners are stepping up to the 300-hp IO-550 in this series of Bonanza, with excellent results. The V35B's instrument panel is spacious enough; but the throw-over yoke remains to block the view of instruments and switches, and the gear and flap levers are found in unusual locations. You could also say that everyone else's levers are in the wrong place, since Beech did it first. Even so, many accidents each

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*A trim, speedy single,
few could have
predicted the
Bonanza's success
and longevity.*

year are caused by pilots' tugging on the gear switch during roll-out, intending to retract the flaps instead. Beech has yet to—and perhaps never will—give the short-body Bonanza the A36's much-improved panel.

Deakin's airplane shows the strengths of the V-tail Bonanza well—excellent speed and climb performance, and decent load-carrying capacity despite the CG concerns. It feels solid and stable—especially with the yaw damper on the job—although control harmony is not quite as good as the straight 35's. (It remains, however, the handling yardstick against which virtually all other singles are measured.) The Robertson STOL kit also highlights where the airplane might have gone had Beech continued with it. The full-span flaps give the airplane awesome short-field performance and allow approaches down to 55 knots indicated without a hint of wallow or misbehavior. It's downright unnerving the first few times you try it, too, ushering this 3,400-pound airplane so slowly on final approach. And yet there are few practical limitations to the setup, save for cost.

According to Ball, Beech management met repeatedly in the late 1960s

and early 1970s to talk about a Bonanza replacement. Engineers at the firm knew that the V-tail airplane's CG and control-authority issues meant that the configuration had reached its maximum potential with the then-current airplane. More power and more weight surely would call for a new design. A cabin-class Bonanza replacement was floated—and a mockup constructed—but it didn't fly past Beech management. (Other design concepts were circulating at Beech in the late 1960s, one a six-place single that looks remarkably like a Piper Malibu.) Ultimately, Beech found the answer to the 35's shortcomings right at home, in the 36. Basically a Model 33 stretched 10 inches ahead of the wing, the 36 went on to become one of the most desirable Bonanzas ever made. It also spawned a pair of turbocharged variants and a trio of twins, one pressurized. Some 3,500 Model 36s have been built since 1968, compared to 1,500 V35As and V35Bs, and about 1,550 Debonair/Bonanza 33s.

Is the short-body Bonanza dead? Beech has quietly suspended production of the F33A after seeing sales fall against an ever-increasing price. Through the third quarter of 1995, Beech sold 63 A36s and six B36TCs, compared to a paltry four F33As. As such, we might well be witnessing the end for the direct descendent of the 35 Bonanza at the 50-year mark. We should all hope that Beech continues with the Bonanza in some form, because it's too good a design to let die. Like the mighty redwoods, the Bonanza still stands tall and evergreen in the hearts of its enthusiasts—even after all these years. □