





## Budget Buy

# Cargo Sierra

A baby Bonanza earns its keep

BY ALTON K. MARSH

**H**ow does a Beechcraft Sierra raise its gear? Any way it wants. You pull the gear handle to raise the gear on a Sierra and it kicks off a Keystone Kops act: The nosewheel pivots 90 degrees before entering the wheel well, yawing the airplane in the process. Adding to the awkwardness, the three gear legs don't retract simultaneously, and the main gear, built as tough as that on any fighter jet, folds out, not in, during retraction.

The Sierra was part of Beechcraft's Musketeer line, and folding the main gear outward allowed the fuel tanks to remain in the same location as on earlier fixed-gear models, reducing engineering costs and keeping weight inboard for better roll control. It also reduces roll-trim changes with fuel usage. The nose gear rotates because the wheel well couldn't be designed to be tall enough without intruding on the placement of the existing flight-control cables. It could have been solved by re-engineering the airframe used on the fixed-gear models 19 and 23, but that would have been expensive. The emergency gear system involves releasing hydraulic pressure and allowing springs and gravity to pull the gear down. If the hydraulic system fails (because of a leak or broken hose), the gear falls into locked position.

Once its ungainly act is over, though, the Sierra proves its worth as a utility airplane, although reviewers over the

PHOTOGRAPHY BY MIKE FIZER







A roomy cabin is one reason Sierra pilots will put up with less than startling speed. The split second-row seats were an option.

years have derided it for cruise speeds in the 120-to-130-knot range.

Not Paul Werbin's Norfolk-based Sierra, though. During a flight test for this article it produced a solid 140 KTAS, thanks to the modifications he has made. Werbin uses all the utility capability this super Musketeer can provide. Produced from 1970 to 1983, the one factory improvement that pulled it even with fabled haulers like the fixed-gear Cessna 182 was the addition of a 36-by-38-inch cargo door on the left side.

When Werbin's Sierra was built in 1981 the Beechcraft Sierra was considered the Cadillac of the light retractables, and was at a Cadillac-like price: \$100,000. There are 500 of the Sierra A, B, and C retractable models on the current FAA registry, and of those, half are

C models. There were 783 retractable Sierras built, according to figures listed on the Beech Aero Club Web site ([www.beechaeroclub.org](http://www.beechaeroclub.org)).

The very first Sierra off the production line—a 1970 model with serial number MC-2—is now owned by Hamilton Rial III in Austin, Texas, and the photo of it on the facing page clearly shows the difference: There's no pilot door and only a small cargo door. In 1971 the pilot door was added, but passengers entering the six-seat configuration of that model were left to fight their way to the back row—somehow. In 1973 the cargo door was enlarged to

let the passengers in, but most owners ignored the third-row "family" bench-seat option and loaded bulky items through that door into a generous cargo space. Werbin takes out one or both bucket seats in the second row and hauls two or three passengers with two or three bikes. The "split" second-row seats, as they were called, were an option: The standard factory installation was a bench seat for the second row. Second-row seats can be removed in a minute by unlocking two knurled thumbscrew Camlocs per seat. Once the seats are out, you have a flying pick-up truck.



## Upgrades

Werbin's favorite trips from Norfolk are dinners in Atlantic City; day trips to New Jersey; a 3.5-hour flight to Martha's Vineyard, Massachusetts, where the bikes come in handy; flights to the Bahamas and to Myrtle Beach, South Carolina; and flights to make sure he doesn't miss the sunset, or just a visit to a new \$100 hamburger joint. Many owners report 5.5-hour trips with an hour of fuel remaining. (To achieve that, they run one tank dry.) They end up beating the times of faster aircraft that have to make a fuel stop along the way. All 24R aircraft carry about 60 gallons: Only the usable-fuel placard changed. The A-model Sierra was placarded at 58.8 gallons, the B at 52 gallons, and the C at 57.2 gallons. The smaller number for the B24R might have resulted when one of the Sierras was discovered to have a misoriented fuel pickup point, Sierra owner and mechanic Mike Rellihan suggested. Rellihan, a founding director in 2004 of the independent Beech Aero Club, is responsible for most of the type club's technical articles on its Web site.

Werbin bought the aircraft in 2000 for \$67,000, and estimates he added \$60,000 in upgrades. They range from basic things like an engine overhaul (\$15,000) with Unison Lasar ignition to technology enhancements like a Bendix/King KLN 90B GPS certified for IFR, KMD 250 multifunction display, KDR 510 datalink weather receiver, and KT 73 transponder with Mode S and traffic capability. There is also a Goodrich Stormscope WX-900 and a J.P. Instruments EDM-700 engine data management system.

He thought about a three-blade prop, but his experience as an FAA safety counselor and flight instructor gave him pause: A three-blade prop robs you of gliding distance in an emergency, he said. What he gave up with a two-blade prop, he said, was short-field performance. "In addition, there are cruise efficiency reasons and payload reasons why planes like the [Piper] Malibu came with two-blade props. The Sierra doesn't need more weight on its nose," Rellihan added.

Other niceties include a PS Engineering PM-3000 six-place intercom and extra post lights aimed at the fuel

selector on the floor. There are similarities to the A36 Bonanza, most noticeable in the appearance of the flap handle and gear switch. In fact, the aircraft has gained from some the moniker of "baby Bonanza," and is often mistaken for the A36 by less experienced ramp personnel, no doubt because of the four side windows. The cabin width beats all Bonanzas and even twin-engine Barons.

To keep all that technology accurate, Werbin pays \$1,650 a year to update software for the GPS, the multifunction display with terrain database, and a subscription to a weather service (future wants include datalink satellite weather, compared to the current ground-broadcast datalink weather service he now has). Data for the multifunction display alone is \$700 a year. Overall, updates add \$10 an hour in operating costs (he flew only 165 hours last year, but normally flies 250 hours per year) to keep the technology current. His insurance, which includes \$1 million in liability coverage with discounts for taking the FAA Wings program and hangaring the airplane, comes to \$1,699 a year.

**What you'll hear from other pilots, after you hear the Sierra is slow, is that the aircraft is difficult to land, thanks to hard rubber donuts that exacerbate a hard nosewheel-first landing.**



The panel was built 24 years ago but was roomy enough to easily accommodate modern moving-map displays.



**Removal of the second-row seats converts the aircraft to a flying pickup truck.**






Contrast this photo (above) with the first production Sierra on the opposite page. The cargo door is big enough for a bike.

**Do Sierras porpoise?**

What you'll hear from other pilots, after you hear the Sierra is slow, is that it is easy to make a landing that results in porpoising. But that's only if you let it. It can happen, and the trait is attributed to firm rubber donuts in the landing gear serving as shock cushions that exaggerate the effects of a nosewheel-first landing. While all three gear have the donuts, it is the one in the nosewheel that can turn a bad landing into a prop strike. If the nosewheel is landed hard, the compressed energy in the rubber donut, unlike the energy-absorbing air and oil nose struts on other makes of aircraft,

**Sierra Timeline\***

<p><b>1970</b></p>	 <p>The aircraft is advertised as the "Sierra."</p>	<p>B24R model is introduced with new instrument panel, larger baggage door, quadrant-style engine and prop controls, and a shorter Hartzell prop instead of a McCauley.</p>	 <p><b>1974</b></p>
<p>First retractable Musketeer Super R (A24R) model is offered.</p>	<p><b>1971</b></p> <p>Left-side cockpit door is added.</p>	 <p><b>1973</b></p>	<p>Full-size aft baggage door allows certification of fifth and sixth "child" seats with a recessed foot well. Yearly production reaches a peak of 113 aircraft.</p>

\*Information from AOPA Topic Sheet and Beech Aero Club.





This is the first production Sierra built—still flying in Austin, Texas—and consequently lacks the pilot door and a large rear cargo door.

bounces the nose up strongly—the start of a porpoise. “On the third porpoise you’ll lose your prop,” Werbin said. Thus, something to look for on any Sierra is a bent firewall. “But if it has been fixed, the fact that it was bent doesn’t matter,” Werbin said. To avoid the problem, of course, is to maintain basic pilot skills and never land on the nosewheel. The donuts work well for normal landings.

“The donuts typically last 25 years or so with no attention, then get replaced at today’s cost of maybe \$3,000 total for all three gear. Compare that with all the grief that a typical owner [of air and oil gear on other-make aircraft] goes

through over the years, dealing with leaky struts, air or nitrogen recharges, and strut rebuilds,” Rellihaan said.

The Sierra has trailing-link landing gear like the Rockwell Commander 112 and 114, and is therefore said to have improved ground handling and a smoother taxi ride.

#### Flight test

My first impression on walking up to the aircraft was the small size of the wings, but that contributes to crisp roll—the aircraft responded quickly to control inputs and you needn’t herd it around the sky. That’s not to say it is unstable in roll.

During the photo flight I found it solid and among the easiest aircraft I have flown when maintaining the precise positioning needed for formation flight. The evaluation flight included the usual stalls, steep turns, and slow flight, with slight changes in procedure at Werbin’s request to avoid shock cooling the newly overhauled engine. As is often the case, stalls were not only gentle but also occurred well below the published speed, with minor buffeting and little or no wing drop-off at the point where the stall occurred.

Hands off in level flight, I noticed a slight roll to the left. The solution is to



Included are new aileron bearings for smoother control, an improved overhead cabin-vent system, a 2-inch-longer Hartzell prop, leading and trailing fairings for the main gear wheels, and aileron gap clearance reduction. The combination of an improved propeller and drag reduction resulted in a 5-knot-faster cruise speed.



Conversion to 28-volt electrical system.



Production drops by half, to 40 for the year.



Production drops by nearly half again, to 24 for the year; starter-engaged warning light is added.

**1983**  
Production halts with only 13 C models manufactured for the year.



make an external adjustment to one of the flaps on the heavy wing. It moves the flap back a very short distance that is not obvious to the naked eye, Rellihan said.

There is no rudder trim in the cabin. On the Sierra, rudder trim must be adjusted on the ground by a mechanic by changing the setting of the nosewheel steering rod under the cowling to meet specifications. Rellihan praised the aircraft for being easy to rig.

There are only a few minor airworthiness directives (ADs) to report. One concerns the ignition switch and can be signed off by the pilot, while another is fixed by installing a Brackett air filter. AD-87-08-02 requires a five-minute inspection of the stabilator hinge fitting, looking for loose rivets and cracks. Others affect the engine. One common to all fuel-injected Lycoming engines in all airframes calls for inspection of fuel-injection lines and the Bendix (left) magneto impulse coupling. There is a Lycoming mandatory service bulletin (SB 388B, 1992) for sticky valves in the engine that calls for a "valve wobble test" every 400 hours, but most Sierra owners have never seen the problem, said Beech Aero Club's Rellihan. That doesn't mean it is unheard of; an owner in Canada who was contacted for this article reported once having a sticky valve.

A second impression is of a large, comfortable cabin. The cabin is 2 inches wider than an A36 Bonanza's. Cabin noise seemed high; however, use of an

## Hits and Misses

### Hits

- Hauls a lot and comes close to the Cessna 182 in useful load.
- Has six seats or huge baggage area, your choice.
- Huge rear cargo/passenger door.
- Large cabin with twin front doors.

electronic noise-canceling headset brought the sound to acceptable levels. I doubt I would say the same for passive noise-reduction headsets.

Werbin has developed his own form to calculate center of gravity (CG) quickly, but he has yet to find a load that was out of CG.

After air work it was back to Norfolk International Airport, where controllers wanted speed kept well above normal to accommodate arriving and departing airline traffic. Since the gear can be deployed at typical cruise speeds, the Sierra is well suited for fast finals and slam-dunk arrivals such as those found when mixed with faster aircraft at busy fields. Conditions were gusty, with a 30-degree 10-knot crosswind. The Sierra was well behaved and gave not a hint of a desire to porpoise.

### Safety record

Porpoising on landing is hotly debated

### Misses

- Could use more speed.
- Could use an in-cabin rudder trim.
- Parts are expensive and scarce, but available.
- High cabin noise.

among Sierra owners, since few have seen the problem and most feel the airplane has been given an undeserved bad rap. Safety reports show little evidence of the problem. However, it does appear to have contributed indirectly to a fatality in 1994 at College Park, Maryland. While not resulting in a propeller strike, the porpoising ended with a decision by the pilot to go around with gear fully extended. The go-around was unsuccessful. The NTSB said the aircraft was carrying 70 pounds in excess of its maximum gross weight.

The AOPA Air Safety Foundation has information on 105 Sierra accidents from 1983 to the present (available online at [www.asf.org](http://www.asf.org)), and 22 of those were fatal. Only two appear to be linked to mechanical defects—an open door in one that distracted the pilot and a propeller that failed in flight in another. The rest of the fatal accidents were related to weather, terrain, and pilot maneuver-

## SPECSHEET

### 1981 Beechcraft C24R Sierra

1981 new price for similarly equipped Sierra: \$95,000

Today's Vref base price: \$69,500

Price as tested: \$97,000

#### Specifications

Powerplant ... 200-hp Lycoming IO-360-A1B6  
 Recommended TBO .....2,000 hr  
 Propeller .....76-in Hartzell constant-speed, two-blade  
 Length .....25 ft 9 in  
 Height .....8.1 ft  
 Wingspan .....32 ft 9 in  
 Wing area .....146 sq ft  
 Wing loading .....18.84 lb/sq ft  
 Power loading .....13.75 lb/hp  
 Seats .....4, 6 possible  
 Cabin length .....7 ft 11 in  
 Cabin width .....3 ft 8 in  
 Cabin height .....4 ft  
 Cabin doors, both sides .....36 by 38 in  
 Standard empty weight .....1,720 lb  
 Empty weight, as tested .....1,810.9 lb  
 Max ramp weight .....2,758 lb  
 Max gross weight .....2,750 lb  
 Max useful load .....1,030 lb  
 Max useful load, as tested .....939 lb  
 Max payload w/full fuel .....687 lb  
 Max payload w/full fuel, as tested .....596 lb

Max takeoff weight .....2,750 lb  
 Max landing weight .....2,750 lb  
 Fuel capacity, std .....59.8 gal  
 (57.2 gal usable)  
 358.8 lb (343.2 lb usable)  
 Baggage capacity .....270 lb, 19.5 cu ft  
 Baggage door .....22 by 33 in

#### Performance

Takeoff distance, ground roll .....1,100 ft  
 Takeoff distance over 50-ft obstacle .....  
 .....1,630 ft  
 Max demonstrated crosswind component  
 .....17 kt  
 Rate of climb, sea level .....862 fpm  
 Max level speed, sea level .....145 kt  
 Max level speed, 6,000 ft .....141 kt  
 Cruise speed/endurance w/45-min rsv, std  
 fuel (fuel consumption), 8,000 ft  
 @ 75% power, best economy .....  
 .....135 kt/5.7 hr  
 (60 pph/10 gph)  
 Range .....620 nm  
 Service ceiling .....14,350 ft

Landing distance over 50-ft obstacle...1,330 ft  
 Landing distance, ground roll .....760 ft

#### Limiting and Recommended Airspeeds

V<sub>X</sub> (best angle of climb) .....71 KIAS  
 V<sub>Y</sub> (best rate of climb) .....85 KIAS  
 V<sub>A</sub> (design maneuvering) .....125 KIAS  
 V<sub>FE</sub> (max flap extended) .....96 KIAS  
 V<sub>LE</sub> (max gear extended) .....135 KIAS  
 V<sub>LO</sub> (max gear operating)  
 Extend .....135 KIAS  
 Retract .....113 KIAS  
 V<sub>NO</sub> (max structural cruising) .....143 KIAS  
 V<sub>NE</sub> (never exceed) .....168 KIAS  
 V<sub>R</sub> (rotation) .....66 KIAS  
 V<sub>S1</sub> (stall, clean) .....65 KIAS  
 V<sub>SO</sub> (stall, in landing configuration) .....60 KIAS

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.



ing, and one was because of poor electrical maintenance.

Several Sierra owners submitted comments for this article, and two reported mechanical problems. One owner (owner responses are posted on a special AOPA Online Web page, see below) reported failure of the nose gear, which he attributed to the complex design permitting it to twist 90 degrees during retraction. That same pilot had an engine failure resulting in an off-airport landing with only minor injuries to himself and none to his passenger. The experiences served to demonstrate to him the toughness and safety of the airframe, he said.

Owners indicated, as you might expect, that they are happy with their aircraft, especially because of the roominess of the cabin and that big cargo door on the 1973 and later Sierras. Some reported frustration with the speed, but indicated that this is the sacrifice they made to find a cabin they like. There was frustration as well with the lack of rapid availability and the high cost of Sierra parts, but parts generally can be obtained, although some owners say it can take as long as two weeks. The Sierra was a small fleet even when newly built, and today's parts manufacturers have been reluctant to service such a market. By the same token, few aftermarket modifications are available.

**i** Links to additional information on the Beechcraft Sierra can be found on AOPA online ([www.aopa.org/pilot/links.shtml](http://www.aopa.org/pilot/links.shtml)).

Whatever the shortcomings, though, they appear to be minor. The lack of speed is more than made up for by the engine's economical nine-gallon-per-

hour fuel burn and the endurance that results in 600-nautical mile nonstop flights. You can't ask much more than that from a pickup truck. **AOPA**

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## **Member comments**

Read comments from Sierra owners and submit your own on AOPA Online ([www.aopa.org/aircraftreports/sierra](http://www.aopa.org/aircraftreports/sierra)).

A future used-aircraft report will feature the Piper J-3 Cub. If you would like to share your experiences as a J-3 Cub owner and/or pilot, e-mail us at [pilot@aopa.org](mailto:pilot@aopa.org) with "Piper J-3 Cub" in the subject line. Please include your name and contact information in the e-mail. The information you provide may be published.