RISING STAR

A heavenly body in its ascendancy

BY RICHARD L. COLLINS

Nothing new in the sky? Yes, there is. The Beech Starship is here, in use by customers, drawing attentive crowds wherever it goes. Taxi it around on any airport, and people wave and take your picture. No airplane gets more attention than a Starship. You could park an F–117A Stealth fighter and a Starship on the same ramp, and they would draw an equal crowd. The Starship simply has every appearance of being something not from this fading century, but from the next century. It embodies all the promises that aviation has been longing for. A composite canard pusher is the magic of dreams—a new beginning. ■ The Starship does have to be approached as a beginning to properly appreciate the effort. Right up front, the airplane does not meet many of the initial promises that were made by folks with Starships in their eyes. It is over on weight, short on cruise speed, noisy in the cabin, and a bit truck-like to fly, especially as regards

PHOTOGRAPHY BY MIKE FIZER

roll control. Required runway lengths are greater than for some light jets. There are those who dismiss the airplane for its shortcomings. They are making a serious mistake. No airplane is ever perfect to begin with. Anybody who was looking for the Starship to be without compromise from the start simply tossed history and the realities of airplane design and construction aside.

Where the Starship is perfect is in sizzle. When flying the airplane, you honestly feel like you are in another world. I thought I had this scoped out when flying the airplane, taking in the glass cockpit, looking at the forward wing, looking back at the tip sail. Then I looked down at the shadow streaking across the ground and was totally struck with the feeling that, finally, after 39 years of flying, I had found a next-generation general aviation airplane.

The Starship has a pair of Pratt &

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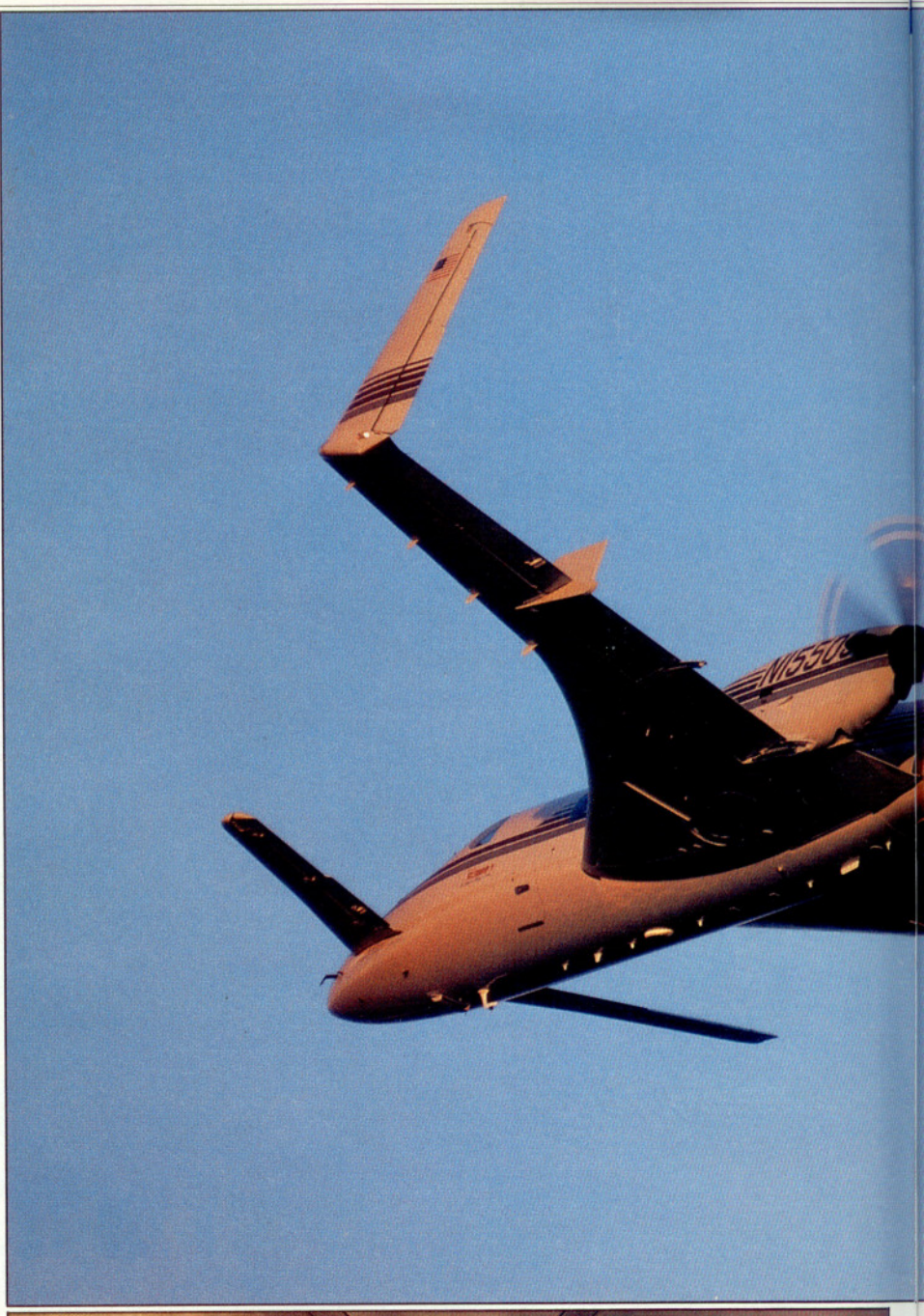
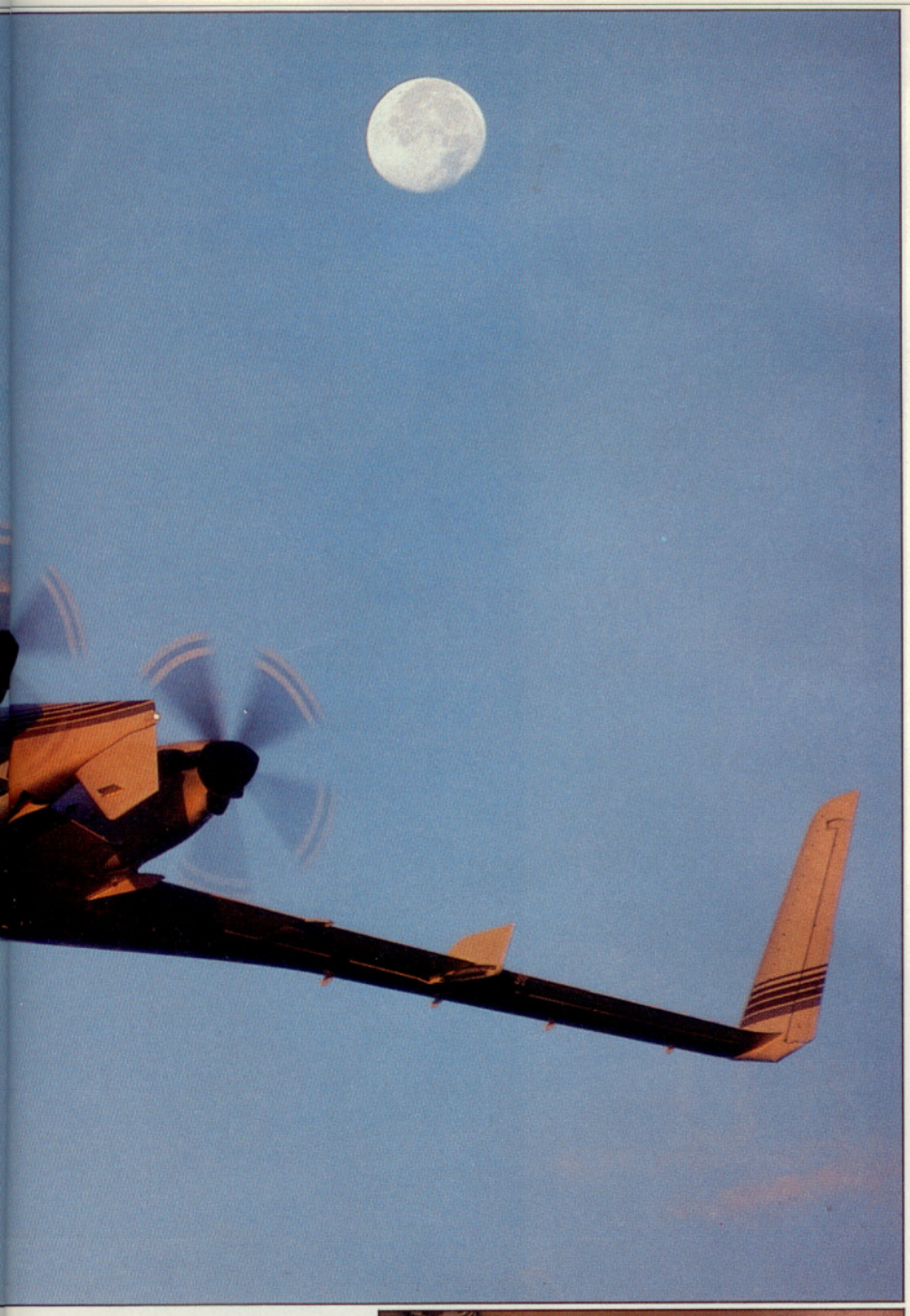
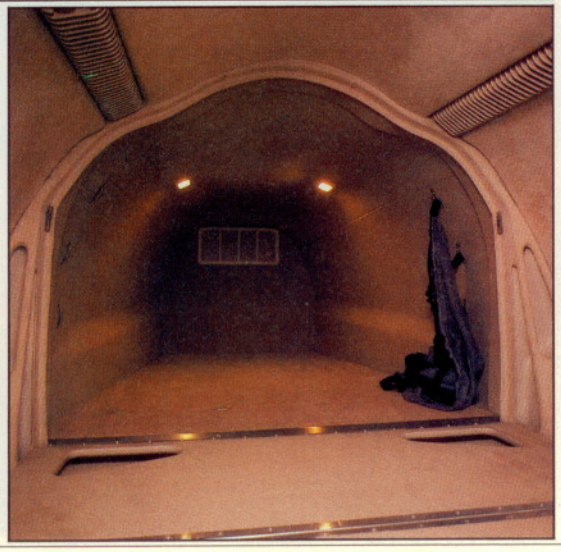
Whitney turboprops and switchology from the same people who did the King Air. Operating it is thus much like operating a King Air. If you can start a King Air and get all the switches set, you can manage the Starship.

The avionics system is different, though, designed by Collins Avionics especially for the airplane. It uses 16 tubes to give you the message, with everything presented on screens. The engine indication caution advisory system, tells you on a screen all you need to know about the engines and includes annunciator functions for the engines and systems. The only instruments as such are the center-mounted emergency mechanical necessities: airspeed, attitude, and altitude. Two of the tubes, RMIs, are monochromatic to minimize current drain and maximize the effectiveness of the battery in the unlikely event of a dual generator failure. Operating on battery power alone, with essentials, there is adequate capacity in the battery for 35 minutes of flight.

The avionics/instrument system was designed to be as simple to use as it is complete. Inputs are on a keypad, and you put them where you wish with buttons on each side of the other displays.







Want sizzle? Starship's got it—resin-bonded carbon-fiber structure, a pair of pusher turboprop engines, forward and main wings, and tip sails. There is no other shape like it at the flight levels. The leather-finished cabin is surprisingly conservative given the airplane's unconventional shape and technology. Baggage is loaded through the cabin and stowed aft of the rear seats.

In the whole layout, only one thing is elusive—vertical speed. It is cleverly hidden, but once you find it, incorporated with the altimeter, it makes sense. If you happen to want to do steep turns, though, it remains elusive, and pitch attitude and altitude become better measures of how the turn is going. The airspeed indicator has a trend indicator that shows where the airspeed will be in 10 seconds if the current trend continues. That is quite helpful, especially when the airplane is being slowed to approach speed. The instrument panel can only be described as beautiful as well as user-friendly.

The deicing system on the Starship is automatic, driven by an icing sensor. Engine exhaust automatically deices the pusher propellers. In keeping with the Starship's futuristic manner, the airplane wears silver boots on its flying surfaces.

Controls free and correct? There is an elevator on the forward wing, augmented by elevons on the rear wing that work both in roll and pitch. When checking the controls before takeoff, I found it interesting that the forward elevator moves down when the control wheel is moved aft. "This," I thought, "requires faith in the designer."

For takeoff at the weight we had, rotation speed was 109 knots; V_2, 119 knots. Because the Starship has a takeoff weight of over 12,500 pounds, you have to abide by balanced field length considerations, just as on a jet. At a maximum takeoff weight of 14,400 pounds at sea level and a temperature of 30 degrees Celsius, the required runway length for takeoff is 4,500 feet.

Initial acceleration on the Starship is spectacular, but it seems to fade as the takeoff continues, which explains the runway requirement. At 109 knots, it lifts off eagerly; initial climb is brisk, and it is here that the Starship introduces you to something new. The aircraft is quite stable in roll. It is also affected in roll by both speed and power changes. The result is that the pilot may feel a bit behind on control of the aircraft at first. Most of us are not accustomed to an airplane that has to be trimmed in roll for every power or speed change. Hand-flying it on instruments would best be avoided until this characteristic is fully digested.

Roll trim is on the yoke, using the same button as is used for pitch trim—left/right for roll and fore/aft for pitch. The button has to be pressed first to arm

it for trimming. Pitch trim seems slow; roll trim, fast. The Starship makes up for the work you do in roll with light pitch forces. Also, there is little pitch change with flaps retraction and forward wing sweep, which occur simultaneously, controlled by a conventional flaps handle. There is a neat visual sensation when that forward wing sweeps.

Climb is at 180 knots, and at climb power, the Starship goes up at more than 2,000 feet per minute on a hot day. The glareshield is high, and the windows are relatively small. Even though it may feel like another world, some effort has to be put into looking for and avoiding the other traffic that is operating in the same old world.

The climb remained excellent to Flight Level 250, where we leveled off and saw a true airspeed of 315 knots while burning just over 800 pounds of fuel (119 gallons) an hour. I remember when we

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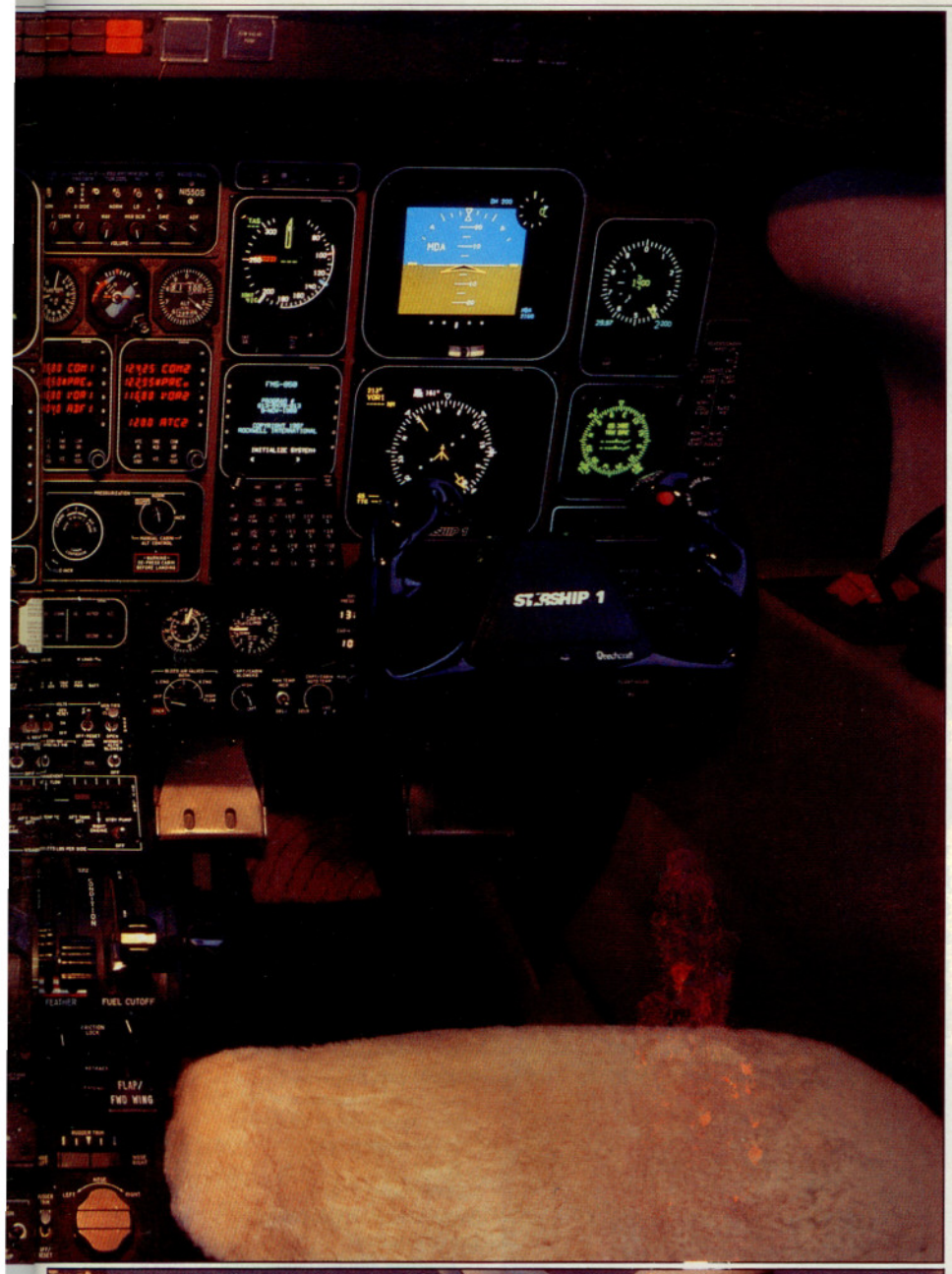
all wondered if we'd ever have a turboprop that would go over 300 knots.

When in level flight, the Starship is a fingertip airplane. All you have to do is relax and gently nudge it when you want to make a slight change.

The airplane is quite easy to configure for an approach. Fly it at 180 knots clean; the gear can go out at a maximum of 200 knots; the flaps and forward wing can be set for landing at 180 knots. The pitch stability helps on nailing the 125-knot final approach speed. That speed sounds high, more like a jet, but the Starship's powerful carbon brakes and reversible props make short work of the landing roll if you want to be aggressive. On my third landing in the airplane, I was able to land and turn off about 2,500 feet down the runway. Given a bit of practice, stops could be even shorter, though the runway-length requirement for takeoff would preclude using airports with short runways.

The flaps are one position, used for both takeoff and landing. There is not a lot of drag from the flaps, and approaches tend to be on the shallow side. The airplane pitches up when power is reduced for landing, and pitch control is hardly needed. Actually, the best land-

The Starship's futuristic image is reflected in the 16-tube Collins instrument panel, designed expressly for the airplane. All navigation and communication information, including frequencies and identifiers, is fed to the black boxes via pilot and copilot keypads. Displays can be transferred among the various tubes. The only mechanical instruments are stand-by attitude and airspeed indicators and an altimeter.



ing would probably come after you learned the rate at which to reduce power to put the airplane in the landing attitude at the right time without the need for elevator.

The carbon brakes call for some technique. When first applied, they do not seem effective. The hotter they get, though, the stronger they get. This can result in uneven braking on the first try or two, but there is a lot to be said for brakes that get stronger rather than fade when you need them most. An antiskid system maximizes brake effectiveness and would keep you from blowing tires with overenthusiastic brake use.

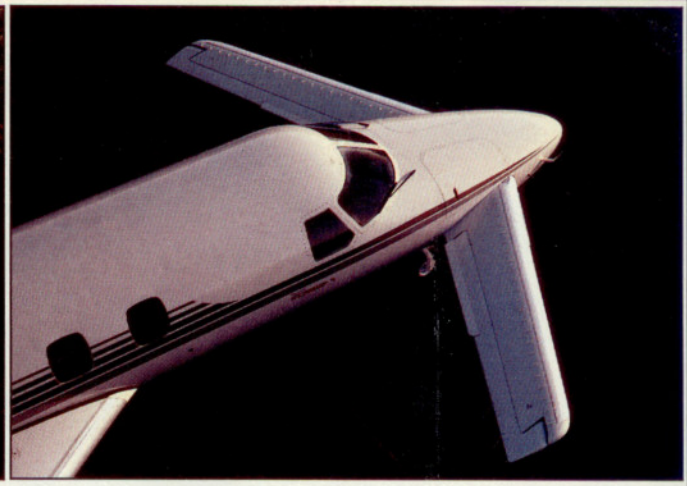
The two places you most notice the rolling tendency with power changes are on initial climb and final approach. There is no question that the Starship requires muscle in both places. It doesn't require substantial control deflection to counter the roll (the airplane rolls right with an increase in power, left with a decrease), but the deflection that is required calls for a show of force. The roll is caused by a change in the twisting tube of air that is created by the two rear-mounted propellers both turning in the same direction. The guy that Newton, Kansas, was named after made a law about equal and opposite reactions that seems to hold sway here.

The first landing I made in the Starship was a pretty good one, even if left-wheel first. The next two were with a thump. The Starship landing gear is rather stiff, and the tires are relatively small. Unless you really grease it on, the arrival won't go unnoticed by those in the back.

Stalls are nonevents in the Starship. It has a stickshaker and pusher, but if you go beyond them into an aerodynamic stall, there is only a slight bobbing. It behaves and performs well on one engine, with automatic rudder trim as well as auto-feather to help the pilot care for an engine-out condition. The rudder force that you have to offer when the event begins is not particularly high and is quickly trimmed away.

The cabin of the Starship is large, offering a double club arrangement. The baggage goes aft and has to be loaded through the cabin. The airplane flown had an interior that was quite nice, though if you didn't look out the window at the beautiful wing, you'd never know you were in such a different airplane. Perhaps there is a way to make the inside as futuristic as the outside.

Beech is working to reduce the noise



level in the cabin and to improve the air conditioning system. Now, the airplane is cool and quiet on the flight deck but neither in the cabin. That's where the person with the bucks will ride in most Starships, and they should soon have it in good shape back there.

The ride in turbulence is good, though when being hand-flown, there are usually some small pitch excursions with the bumps. These come from a touch of overcontrolling because of the light pitch forces. A yaw damper is included, but its use is not required.

Beech has invested heavily in the Starship, and while the returns won't be quick in coming—the company plans to deliver 13 this year and about the same number next year—they are coming. As a by-product, Beech has developed advanced composite technology and already has a contract to build C–17 landing gear doors, a shipset of which contains as much composite material as a Starship.

Testing of the Starship's composite construction is extensive, with every structural square inch tested for integrity. The airframe has far fewer parts than an aluminum airplane—it's a lot like those plastic model airplane kits with the fuselage constructed in two halves and the top and bottom wing skins in one piece. Beech has yet to see a saving in labor on the airplane, but the manufacturer is gaining in that area. While the Starship has fewer airframe parts, the systems of the aircraft are as labor-intensive as in any other airplane. Weight, one of the alleged benefits of composites, is lighter than if the airplane were metal, according to Beech engineers. However, the Starship's empty weight is much greater than the original projections.

The Starship is a bold entry in the next generation of general aviation airplanes. It is probably the most needed airplane ever built, proving that there are ways other than the conventional to build airplanes. The investment in the airplane is a vote of confidence in the future of general aviation, and as time runs, the Starship will become ever more important. For now, it is a fine airplane that will make a definite statement about its owner: out front all the way. □

Beechcraft Model 2000
Base price: $4.1 million

Specifications

Powerplants	P&W Canada PT6A-67A, 2,400 shp
Recommended TBO	3,000 hr
Propellers	McCauley, five-blade, 104-in diameter
Length	46.9 ft
Height	12.9 ft
Wingspan	54.4 ft
Wing area	280.88 sq ft
Wing loading	51.27 lb/sq ft
Power loading	6 lb/shp
Seats	10
Cabin length	26.6 ft
Cabin width	5.48 ft
Cabin height	5.46 ft
Empty weight, as tested	10,250 lb
Max ramp weight	14,510 lb
Useful load, as tested	4,260 lb
Payload w/full fuel, as tested	683 lb
Max takeoff weight	14,400 lb
Max landing weight	13,680 lb
Zero fuel weight	12,200 lb
Fuel capacity, std	538 gal (534 gal usable) 3,604.6 lb (3,577.8 lb usable)
Oil capacity, ea engine	16.35 qt
Baggage capacity	685 lb

Performance, preliminary

Takeoff balanced field length	4,050 ft
Rate of climb	3,050 fpm
Single-engine ROC	830 fpm
Cruise speed/endurance w/45-min rsv, std fuel (fuel consumption, total)	
@ rec cruise power	312 kt/4.12 hr
FL290	(734 pph/109.55 gph)
Max operating altitude	41,000 ft
Single-engine service ceiling	17,500 ft
Landing distance	2,720 ft

Limiting and Recommended Airspeeds

Vmc (min control w/one engine inoperative)	101 KIAS
Vy (best rate of climb)	140 KIAS
Vyse (best single-engine rate of climb)	130 KIAS
Va (design maneuvering)	181 KIAS
Vfe (max flap extended)	180 KIAS
Vle (max gear extended)	200 KIAS
Vlo (max gear operating)	
Extend	200 KIAS
Retract	180 KIAS
Vmo (maximum operating)	270–173 KIAS, Mach 0.6, depending on altitude
Vr (rotation)	109 KIAS
Vs1 (stall, clean)	99 KIAS
Vso (stall, in landing configuration)	94 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.

For more information, contact Beech Aircraft Corporation, Post Office Box 85, Wichita, Kansas 67201-0085; telephone 316/681-7111. □