

The challenge has been there since technological skill began to leapfrog itself: To create a new personal airplane out of space age know-how, to build on novel and exciting ideas, free of yesterday's add-on blunders, to put everything in the right place and make an airplane striking enough in performance and design to carve a substantial niche in the marketplace.

Limited only by the imagination and certain FAA constraints, designers could experiment with every conceivable shape, form and curve, then apply bold new ideas to what is known from space, commercial aircraft and military technology.

North American Rockwell, the nation's 39th biggest industrial corporation, took the challenge awhile back and we flew the result at Albany, Ga.

Manufacturer of jets at Los Angeles, prestigious twins at Bethany, Okla., and the world's biggest ag plane at Albany, North American Rockwell's general aviation division aimed its creation at the newest single-engine retractables. The Aero Commander 112, powered by a 200 hp fuel-injected Lycoming, will compete with Cessna's Cardinal RG, Piper's Arrow and Beech's Sierra.

The 112 was introduced to the aviation press in mid-May at the Albany plant where it is manufactured. Final FAA certification was anticipated shortly afterward. [See page 9—Ed.]

The airplane's shape and appearance will surprise no one, for two reasons. Its first flight and public debut occurred a year and a half ago and, for all its newness and fresh beauty, the 112 has a conventional look about it. The more exotic designs that went onto the drawing board did not go into hard tooling. A striking photo of the 112 in flight was featured on the cover of the April *PILOT*.

The design that got the nod is a flexible one from a growth standpoint. The second model, already in production, is a stepdown to a 180 hp, fixed-gear model, the 111A. Next, a twin or higher horsepower retractable; NR executives won't say which, only that "we plan to expand the line."

Walking around N112JC, number seven off the assembly line, Sales Manager Duane Closs (AOPA 93299) points out the airplane's clean lines and explains design philosophy. The 112 was built to what professional pollsters found that pilots wanted—room and comfort, even at the expense of speed. Two doors make the cabin easily accessible from the low wing. The distinguishing design characteristic is a modified T-tail which, Closs said, gets the horizontal stabilizer out of the propeller stream and into smooth air, eliminating vibration in flight (and improving spin recovery).

Not evident from an outside glance is the interior arrangement, brainstormed by aviation publishers and editors who were asked to tell what they would like in a new airplane.

The airplane is low-slung and beautiful, with a let's-go look about it. It has superb cabin room and comfort—more than any of the opposition. Everything is in the right place to make the pilot's



Aero Commander 112

Pilot Flight Check: The Aero Commander 112

by JOHN PENNINGTON / 155101

All photos by Bill Thompson



General aviation's newest . . .

job pleasant. It rides smoothly on cushioned gear. Flight characteristics are enthralling.

But the magic wand of new design ran out of tricks when it came to the basic problem of lift and thrust versus weight and drag. The Aero Commander 112 measures up on speed—it carries all the new advantages a shade faster than the Sierra, neck and neck with the Arrow, a shade slower than the Cardinal RG. But its useful load is more than 100 pounds less than either.

The 112's useful load is 1,020 pounds. The IFR-equipped "Super Sport" 112 put on the line for flight checks at Albany carried 83 pounds of extra comfort, panel necessities and nav aids. With full fuel (60 gallons), its remaining

capacity is sufficient for two men and their wives or girl friends, if the ladies are on the dainty side and leave all the baggage at home. Or, there's room for three men and 52 pounds of suitcases or golf clubs. Reducing fuel to 50 gallons—total capacity of two of the opposition aircraft—makes another 60 pounds available in the 112.

Whacking the fuel load accurately is no problem. Each of the 112's two fuel tanks has a reduced load indicator in the filler neck with five-gallon step-downs from 30 to 15 gallons.

Basic price of the Aero Commander 112 is \$24,750 faf. The Super Sport used for flight checks, a deluxe instrument ship with a King radio package, would sell for \$36,045. The typical air-

plane with instrument capability but somewhat less frosting would retail somewhere between the two figures—\$30,000 to \$32,000. The price is in line with the market into which the 112 is injected.

A walk/talk look at the airplane reveals some of its features: an optional time-delay light for the cabin step; battery and hydraulic power supply accessible through the double-latch outside baggage door; a roomy, 200-pound baggage capacity with recessed clothes hanger; electric/hydraulic power for gear and flaps, independent of engine operation; auxiliary power plug, near the battery instead of near the engine;

gross. It was shirt-sleeve weather and the wind on Runway 4 at Albany Dougherty County Airport was light.

Takeoff in the 112 is accomplished with 10 degrees of flap and the electric fuel pump on. Lift the nosewheel at 58 knots (67 statute) and you're off and flying. Gear and flaps up, aux fuel pump off, power to 26 inches/2,600 rpm for climb, and the magic number then is 90 knots. The airspeed indicator (ASI) is in nautical miles, instead of statute miles, a nice concession to the way things are done in real life.

Bill Brodbeck suggested I try 80 knots initially, the best rate-of-climb speed. With full power, the 112 was hunting

knots, and along about here, thinking knots on the ASI instead of statute begins to feel right. Corrected for pressure altitude and temperature (it was 10° Centigrade and comfortable up there) our true airspeed was 143 mph nautical (165 statute). Company literature pegs the 112's maximum speed at 175 mph statute.

At cruise, the 112 is comfortable and friendly. With good rudder cooperation, it rolls with alacrity. We were in smooth air and the plane held trim speed precisely.

Gear and 20 degrees of flaps may be lowered below 130 knots indicated, which means any time you're not in a dive. From 128 knots, I lowered the gear, measured 20 degrees of flaps and reduced power to 20 inches. Presto, pattern configuration and, with minor trim, level at 90 knots.

"While you're simulating pattern, raise the gear and put the flaps down to 25 degrees," Bill suggested. When the gear lights went out, I depressed the flap handle momentarily. . . . And then the bell rang. If you want to know how the 112 tells you the gear is up when you put the flaps down, set off an old-fashioned Big Ben alarm clock. The clang-clang you get will be equivalent to it.

"Now flaps up and reduce power," Bill suggested.

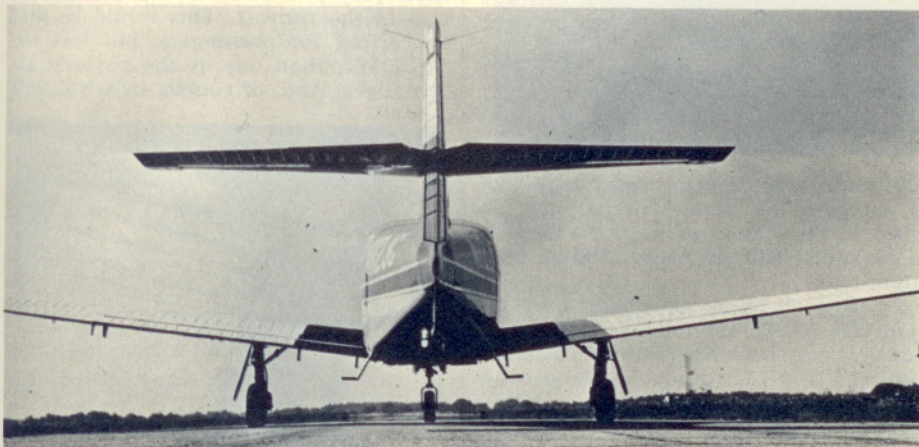
The clock went off again. It is programmed to let the pilot know, any time power is reduced or flaps extended beyond 25 degrees, that the gear has not been lowered. The sound (noise) is distinctively different from the stall warning horn, which also is raucous and very audible.

I wanted to try stalls in pattern configuration, in landing configuration (dirty and power off) and at climb power.

With pattern power and the nose 10 or 15 degrees above the horizon, the airspeed settled and at the end of the green arc (58 knots), the stall warning horn sounded, and the airplane buffeted strongly. Finally it broke at 52 indicated, but not sharply. I kept the wheel back to check aileron control in the stall and finally 112JC despaired of my heavy-handed persistence and rolled off to the right and pitched sharply down. Wheel forward took care of things.

With gear down, full flaps and power off, the 112 stalled gently at 52 knots, giving plenty of audible and physical warning that lift and patience were running out. It had stalled at the same speed with gear down, 20 degrees of flap and low power. At climb power, the nose went so high before the stall warner sounded that I didn't pursue it any further.

Emergency gear procedure in the 112 is simple. If the pilot fails to get a gear down-and-locked indication when the gear handle is down, and a check of fuses and lights doesn't solve the problem, he slows to 75 knots, turns the master switch off, checks for gear handle down, then pulls out and down the red emergency gear handle on the pilot's side of the console under the



Single-engine retractable . . .

North American Rockwell's new single-engine retractable features 'whisper-soft' landing characteristics and is engineered and priced to compete with Beech's Sierra, Cessna's Cardinal RG, and Piper's Arrow

static air vents on both sides of the fuselage, aft of the baggage compartment; tail high enough for head clearance by a six-footer; anti-servo trim on both spans of the stabilizer; ADF antenna built into the dorsal fin; inside air from behind the cabin, for reduced noise; built-in radio cooling vents; and more.

The walk-around does not reveal some other features—fewer parts, greater structural integrity (now required by FAA on newly certificated aircraft), plus other refinements that will have to be standard on new generation airplanes.

Bill Brodbeck, factory sales representative who spent 15 years as a crop-duster, occupies the right seat as we climb in to fly, strapping on the seatbelt and optional inertial reel shoulder harness, which rolls conveniently out of the seat (and back into it) instead of the cabin wall. The harness provides complete freedom of movement, but a sudden 3 Gs reportedly will lock it firmly in place.

For the flight check, N112JC had 25 gallons in each wing tank, 10 gallons short of full. With two aboard and no baggage, we were 287 pounds under

altitude at 1,100 fpm, settling gradually back to about 900 fpm. (The "book" says 1,000 fpm at sea level; Albany elevation—196 feet msl.) With power reduced to the recommended climb value, the rate settled on 800 fpm.

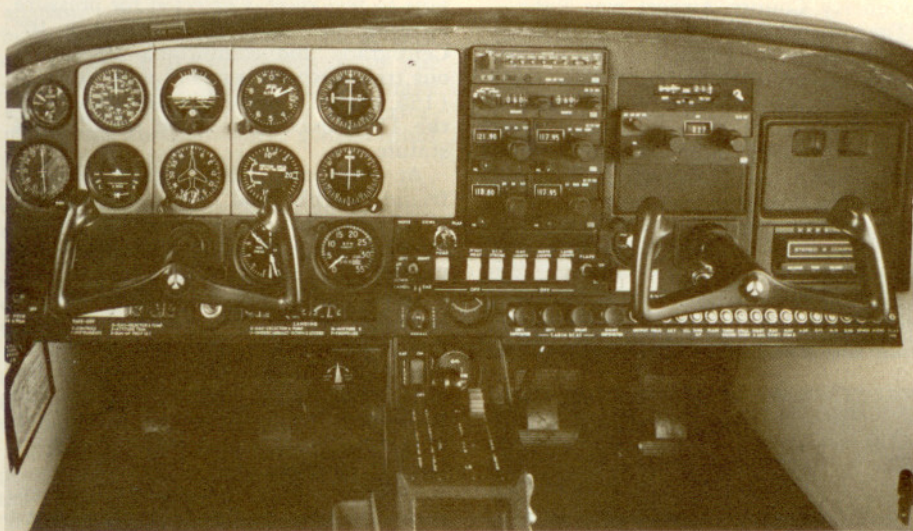
But at this speed (80 knots) the nose is uncomfortably above the horizon, reducing forward visibility. A cruise climb at 90 knots (104 statute) allowed the nose to settle below the horizon and yielded a rate of climb between 600 and 700 fpm.

As the airplane climbed, several plus factors were evident. The sound level was more than comfortable; Brodbeck and I talked in normal conversational tones. Plenty of cool air flowed through the cabin, quietly. And the plane handled well. Aileron response is sprightly and the controls are well balanced, so that no element comes in heavier or lighter than another.

We leveled at 6,500 feet for speed checks and air work. What looks level the first time isn't, and the nose is well down before the rate-of-climb needle is pegged on zero. Visibility is picture-window quality for about 135 degrees either side of twelve o'clock.

The airspeed indicator nails down 128

The 112's panel features standard "T" grouping. FAA officially certificated the new aircraft June 1.



panel. This bleeds the hydraulic system and permits the gear to fall of its own weight, with the aid of a helper spring.

Aero Commander has built a nice go-around capability into its new airplane. From landing approach configuration, with 15 inches manifold, gear down and full flaps, trimmed to 75 knots, I advanced the power levers and waited hands off to see what would happen. The airplane leveled off and then began a gentle climb at about 200 fpm. Airspeed remained at 75 knots. Now gear and flaps up, and the nose pitched up, with the airspeed sliding back to 68. Only light pressure was needed to achieve climb speed and trim for it. Nothing mean here.

What would happen if the pilot's attention were diverted on final approach and he let attitude control get out of hand? I set up landing configuration and trimmed for 75 knots in a normal descent with 15 inches manifold, then began easing back on the control wheel until the airplane attitude was level, then held it there. Airspeed deteriorated to 67-68 knots, the controls got softer, the rate of sink settled on about 200 fpm, and stayed there. As an afterthought, it would be good to try some landings that way.

"Let's simulate an instrument approach," Bill suggested. "Reduce power to 17 or 18 inches, lower the flaps to 20 degrees, and trim for level flight."

Thus set, the 112 stabilized on 90 knots.

"Now check your control responses," Bill said. "Solid. Right?"

Right.

"Now you're at the outer marker. Extend the gear."

Simultaneous with the comfortable thump of the gear dropping into place, the 112 pitched down to hold trim speed of 90.

"How do you like that?" Bill asked. "Right down the glideslope with no power or trim change."

I tried another power/attitude series. At 3,500 feet, indicating 125 knots with 23 inches/2,400 rpm, I reduced power to 18 inches. The plane settled into a

500 fpm rate of descent, with no change in airspeed or trim. For pattern, I rolled in 20 degrees of flap and leveled at 90 knots with no power change and minor trim.

Landing check on downwind is standard; the GUMP reminder is sufficient: Gas on both; Undercarriage down; Mixture rich and fuel pump on; Prop control forward. From this point, all the 112 pilot needs to do is reduce power at the right moment for descent, trim to 75 knots and get ready for the most pleasant surprise of the first flight.

With the nose up in the flare, stall horn blowing, waiting for the landing thump, Bill grins. "Nice landing."

Then realization. We are on the ground, rolling out on the mains in the softest ground ride I have ever experienced in a small plane. Touchdown had occurred while I was still waiting for it.

"That had to be an accident," I tell Bill. "I'd like to try it again."

"Okay," he grinned. "Maybe you were lucky."

Twice more we circuit the field and land to a full stop. Twice more it's a grease job, a spring kiss.

Taxiing back in, I pay closer attention to the ground ride. It is big-airplane smooth over taxiway and ramp, free of bump and drumrumble.

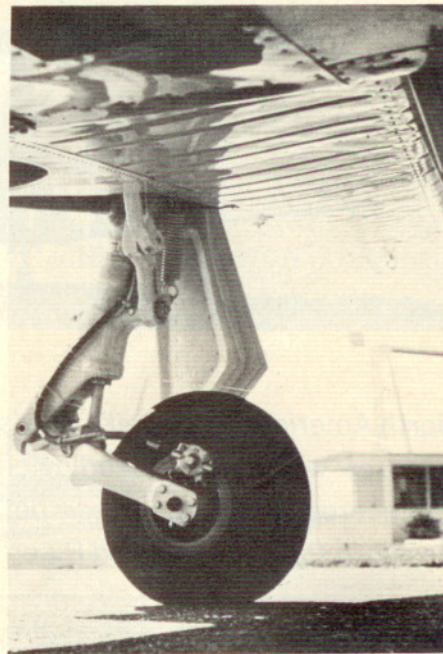
In the conference room, I asked Chief Engineer Marion Dees to explain the landing gear magic.

It is a trailing beam design, an idea that has worked with military aircraft and is incorporated (less effectively, Dees said) in one of the Aero Commander's competitors. The main gear leg contains a piston with a three-inch stroke. The gear wheel trails the piston by 12 or 15 inches, giving it a 10½-inch stroke for lots of settling cushion. "With a normal landing in any other plane," Dees said, "you've got a grease job in ours."

After the flights, I told Bill Brodbeck I had but one complaint—the awkward positioning of the microphone so the pilot has to hunt for the switch after picking it up.

Later, flying away from Albany in an

aging, drafty rental Cessna 150, several other minor complaints edged into mind. I would prefer a better handful of longitudinal trim wheel. It is in the right place, precisely, but small and stiff. The cowl push-pull lever takes a bit more muscle than is comfortable to operate. The flap lever is of the hold-to-set variety, and invariably lags, then overshoots the desired number (an airplane of this quality should have preset detents). The prop control is supersensitive, its stroke out of phase with the throttle. And the stall warning, in my opinion, is too loud. In every landing I made, approaching at 75 knots and flaring, normally I thought, the stall horn played a Sousa concert over the end of the runway. This would be disconcerting for passengers, but less so, I'll admit, than one of the possible alternatives. And, of course, in a \$35,000



The landing gear that's responsible for "whisper-soft" landings.

airplane I would like to be able to carry four souls, utilize that big 200-pound baggage compartment, and still have long legs.

Playing host twice daily one week in May to members of the aviation press, the Aero Commander folks had designed a briefing procedure almost as impressive as their new airplane.

Sales Manager Closs explained the marketing approach. He and staff have built a distributor/dealer organization to handle sales. "We're not after the school or fleet business," he said. "We're going after retail sales, and we don't care if we take them away from Cessna, Piper or Beech."

Seventeen domestic and 10 overseas distributors have been signed up. There are 62 domestic dealers now, and there will be 150 by the end of the year. "We have 455 firm orders today," Closs said, "313 for the 112 and 142 for the 111A. We will deliver 250 airplanes by the end of the year."

Engineer Dees explained 112 design philosophy and Dan Walsh, director of operations, told how he plans to speed the production line from a 16-hour move—one plane every two days—to 2½ hours, for 50 aircraft a month.

Dees pointed out that the 112 is the first retractable to be certified under FAR Part 23, Amendment 7, which requires fatigue life tests, increased gust velocity tolerance, fuel system lightning

arrestors, nonsyphoning fuel caps, greater brake muscle, standard shoulder harness, and audible stall warning, an audible warning if throttle is retarded or flaps lowered with the landing gear up. The American Traveler was the first fixed-gear airplane to meet the new restrictions.

Dees dealt candidly with the fact that the first prototype 112 crashed last October as the result of a structural

failure. The cause was determined to be tail flutter, which developed in a dive at 210 mph. Using a wind tunnel at the company's Los Angeles division, improvements were designed to remove the problem. The tail section was beefed up with several changes, 21 pounds worth in all. "There has been no further flutter and we have made every effort to achieve it," Dees said.

The 112's airspeed indicator is redlined at 180 knots (208 statute mph); the caution line begins at 148 knots (170 mph), well above cruise speed.

Forty-five planes had been built when the accident occurred last October. Dan Walsh put them back on the line for the tail fix. Now he has 200 units in some stage of construction and customers waiting.

Walsh's briefing closed with an optimistic note that brought a smile to Duane Closs' face. Walsh wants to build airplanes and Closs wants to sell them. Walsh said there will be an increase next year in the Albany plant's labor force, a step-up in production of airplanes, and two factory expansions of 25,000 square feet each to make way for further growth.

Closs may have the easier job. The Aero Commander 112 looks good and handles well. This will help. But there is an additional advantage: that whisper-soft touchdown. Good landings shouldn't be hard to sell. □

Aero Commander 112*

(2-door, retractable gear)

Seating capacity	4	Takeoff ground roll (ft)	880
Powerplant	200 hp Lycoming IO-360-C1D6	Takeoff roll (ft, over 50-ft obstacle)	1,460
Wingspan (ft)	32.75	Landing ground roll (ft)	680
Length (ft)	24.92	Landing roll (ft, over 50-ft obstacle)	1,310
Height (ft)	8.42	Rate of climb (fpm, sea level)	1,000
Wing area (sq ft)	152.0	Service ceiling (ft)	17,000
Wing loading (lb/sq ft)	16.78	Stall speed (mph, gear-flaps down)	61
Wheel base (ft)	7.92	Top speed (mph)	175
Gross weight (lb)	2,550	Cruising speed (mph, 75% power, optimum altitude)	165
Empty weight (approx.) (lb)	1,530	Range, cruise (mi, 75% power, optimum altitude, no allowance)	960
Useful load (approx.) (lb)	1,020	Base price (faf)	\$24,750
Fuel capacity (gal)	60		

* Source: North American Rockwell