

# PRESSURIZED AERO COMMANDER 685

*'It costs dough to be in this league,' says evaluator,  
but it 'approaches the ultimate in piston-powered aircraft'*

by MICHAEL V. HUCK / AOPA 213692

I have just had a glimpse of the future. No, not through a crystal ball, but through the windshield of North American Rockwell's contender for the ultimate in piston-powered aircraft—the turbocharged, pressurized Aero Commander 685.

Of course the 685 can't be the "ultimate" aircraft, any more than any other can. It all depends on how the aircraft is going to be used. For example, an aerial applicator (cropduster) probably wouldn't think of the 685 as an ultimate, and neither would a primary flight instructor with a brand-new student. But for someone who wants turbo-prop, above-the-weather comfort and a rock-steady feel for instrument flight, on a piston pocketbook, the 685 just may be the ultimate.

The 685 competes with several top-of-the-line aircraft, like the Beechcraft Duke, the Cessna 421, and Piper's pressurized Navajo, all of which enjoy the advantages of an earlier introduction. But this newest of the Commander line

should have no trouble in grabbing a large percentage of the market.

It costs dough to be in this league, though, and plenty of it. The aircraft I flew had an equipped price of \$309,035, but for that price you get complete de-icing protection, weather radar, and a complete line of King Silver Crown electronics, plus other goodies such as air conditioning and a Bendix M-4C autopilot. The bare airplane carries a price tag of \$229,400, but anyone who can part with that kind of money for an airplane will probably want all the extra accessories.

The 685 is powered by a pair of Continental GTSIO-520-F engines that develop 435 hp at 3,400 rpm while pulling 44.5 inches of manifold pressure. They are able to pull an additional 60 horses more than the previous model of the engine, because they have been beefed up throughout to allow higher manifold pressure. TBO (time between overhaul) is listed as 1,200 hours. One of the nicest features of this new engine is the lack of a rough, loping idle that is characteristic of the lower-powered Continental engines. These seem to idle very smoothly in comparison.

The 685 has a ramp weight of 9,050 pounds and a flying gross of 9,000 pounds, which allows for a 50-pound fuel burnoff while taxiing for takeoff. With an empty weight of 6,822 pounds (as equipped on the flight-test aircraft), this gave a useful load of 2,228 pounds, which can be used in a variety of ways.

This is definitely not a "fill her up and depart" type of aircraft. With auxiliary tanks, which were fitted on the plane I flew, the fuel capacity is a whopping 322 gallons, which gives a range of 1,731 statute miles with a 45-minute reserve. There is a kicker, however.

A full load of fuel (322 gallons) weighs 1,932 pounds; so if you fill it up, you are limited to an additional 466 pounds, which equals two typical 170-pound people plus 126 pounds of bag-

gage or a sweet young thing. Since the cabin on our test aircraft is capable of seating eight, a little mathematics is necessary to determine the fuel load that can legally be carried on a given flight. North American Rockwell arranged it that way on purpose, recognizing that most of the time the aircraft will be used with some seats empty and that, when this is the case, the pilot will want the extra fuel. Human nature being what it is, someone will probably try to fill the plane with both people and fuel sometime in the future (then wonder why it won't fly), but any reasonable pilot who has the ability to add and subtract should be able to avoid this problem.

The pressurization of the 685 works from the ground up and gives a maximum differential of 4.2 pounds per square inch, which results in an 8,000-foot cabin at an aircraft altitude of 20,000 feet. The pressurization is not as high as that of its competitors, which have cabin altitudes, at 20,000, of 7,500 feet for the Cessna 421B, 7,000 for the Beech Duke, and 5,000 for the Piper pressurized Navajo. Regardless, it seems adequate for most conditions, since even with the turbochargers, performance begins to drop off between 20,000 and 25,000 feet.

The day of our test flight was one of those days that tend to make those on the East Coast wish they were somewhere else. A slowly moving front had stalled out on the coastline, and conditions were IFR from Boston to Savannah, Ga. This is the weather that Commanders are built for, though, so we filed IFR for Raleigh-Durham (N.C.) Airport at Flight Level 180 with a filed true airspeed of 220 knots (254 mph).

First thing that struck me about the airplane was the similarity of it to my old 500B Commander. Outside of the new airplane smell, everything was very familiar. One thing that was immediately apparent, however, was the difference in noise level. I didn't think it was

## THE AUTHOR

Michael V. Huck is director of AOPA's Air Traffic Control Department at the Association's headquarters in Washington, D.C. A pilot since 1961, he holds an Airline Transport Pilot Certificate (ATR) and is the only pilot in the United States authorized to conduct ILS approaches to Category IIIC (zero-zero) landings. This authorization was given by FAA after similar tests in Category II conditions resulted in rulemaking that now allows any qualified lightplane pilot to obtain Category II approval. Huck has logged about 3,500 hours and owns and operates an Aero Commander. He is AOPA's representative on a number of domestic and international aviation committees, including the NASA Advisory Committee for Aeronautical Operating Systems.



North American Rockwell's 685 is a pleasure to "drive" and ride, says author. Low noise level is impressive, as is cruise speed, which was clocked at 262 mph true airspeed, 7 mph higher than that stated in the aircraft's performance table.

possible, but they have actually managed to make a quiet Aero Commander. This was accomplished by moving the engines out 15 inches from the old position next to the fuselage. This has cut down the resonance by a fantastic amount, and hence the lower noise level.

### AERO COMMANDER 685

#### (Specifications and Performance)

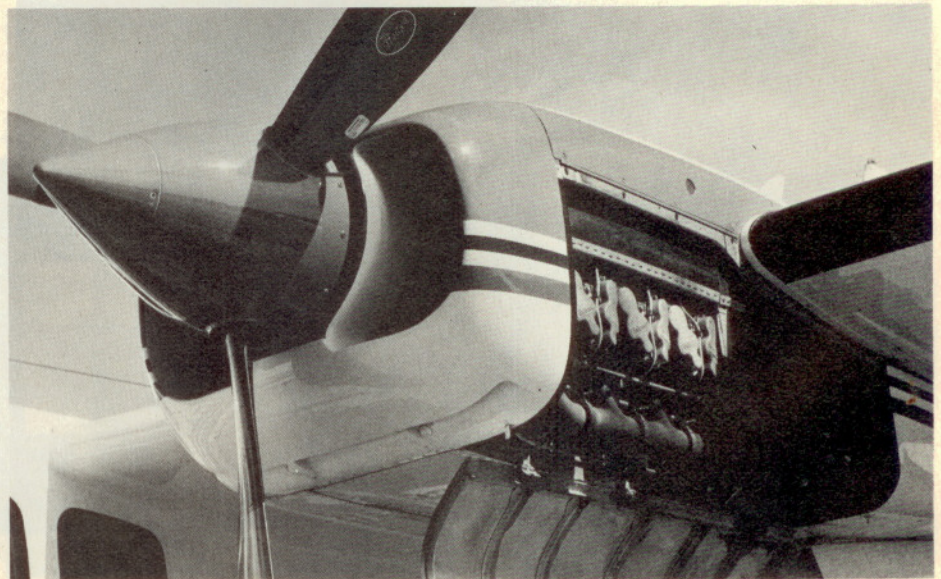
Seating capacity	8
Engines (2)	435-hp Continental GTS10-520-F
Wingspan (ft)	46.55
Length (ft)	42.98
Height (ft)	14.95
Max gross weight (ramp/lb)	9,050
Max gross weight (takeoff/lb)	9,000
Empty weight (approx/lb)	6,021
Useful load (lb)	3,029
Fuel capacity (std, gal)	256
Fuel capacity (opt, gal)	322
Takeoff ground roll (ft)	1,949
Takeoff roll (ft, over 50-ft obstacle)	2,711
Landing roll (ft, over 50-ft obstacle)	2,312
Rate of climb (fpm, sea level)	1,490
Single-engine rate of climb (fpm, sea level)	247
Service ceiling (ft)	25,000
Stall speed (mph, gear/flaps down)	86
Min single-engine control speed (mph)	89
Top speed (mph)	278
Cruise speed (mph, 75% power, 24,000 ft)	255
Range + 45-min reserve (mi, std fuel)	1,274
Range + 45-min reserve (mi, aux fuel)	1,731
Base price (faf)	\$229,400

There is an old saying about the Commander line: "Anyone can fly 'em, but it takes a good deal of practice to be able to taxi one in anything resembling a straight line." The cause for that statement is the hydraulically driven nosewheel steering. It really doesn't take long to get accustomed to it, and once it is mastered, it gives the nicest, easiest ground steering of anything in its class. The rudder pedals are not hooked to anything but the rudders, and nosewheel steering is done with light pressure on the toe brakes. The first bit of travel before the brakes are actuated gives hydraulic boost to the nosewheel. This means that for a fairly heavy airplane, hardly any effort is needed to taxi—once you get the knack of it.

It is difficult to describe the flight characteristics of an Aero Commander. There are subtle differences in feel and motion that make it feel like a much

larger aircraft. For one thing, in the pilot's seat of the 685, you are out ahead of the engines and wing. There simply aren't any blind spots when maneuvering, something that is becoming increasingly important with today's increasing air traffic. The aircraft runs along the ground in a negative angle of attack, which seems to make it less susceptible to crosswind problems, and requires more rotation than most light or medium twins in order to leave the ground. This, coupled with the fact that the pilot sits quite far in front of the center of rotation, is probably responsible for several comments that the airplane feels like a Boeing 727.

Once you're airborne at about 90 knots (slightly more or less, depending on weight) the stability that has become a trademark of Aero Commander allows you to put the airplane where you want it with assurance that



The Aero Commander is powered by twin 435-hp turbocharged Continental engines.

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it will stay that way. The best way to describe it is that it is like a free autopilot that is built right into the airplane.

It's a good thing it's that way, too, for after a climb of less than 300 feet above Washington (D.C.) National Airport, the familiar world of contrasting objects and different colors gave way to the dull gray of the world of IFR. Forty inches of manifold pressure and 3,000 rpm gave an average 1,000-fpm rate of climb to Flight Level 180. The aircraft was right at gross weight with four people and 250 gallons of avgas.

The 685's turbocharger controls worked beautifully. It is a real thrill to one who is used to seeing available power bleed off with altitude to see the manifold pressure gauge sit steady as a rock at 40 inches, with no further adjustments, from the surface all the way to altitude. The same turbochargers supply the bleed air for cabin pressurization, and the cabin transitioned smoothly from sea level at Washington National to 7,800 feet at FL 180.

In the climb, we were solid instruments to 12,000, between layers to 14,000, and back in the clouds between 14,000 and 16,000 feet. When we leveled at FL 180 we were in beautiful sunlight with nothing but blue sky above. As we accelerated to cruising speed, I thought to myself that Walter Mitty lives, as I tried to put aside the realization that, with the sea level engines and lack of pressurization that I have in good old N13M (my Com-

mander), I never would have seen the blue sky that day and would have been slogging around in the gray until the approach at Raleigh-Durham.

With 35 inches and 2,800 rpm, the computer said we were pulling 65% power and the airspeed indicator read 165 knots (all Aero Commander airspeed gauges now read in knots) for a true airspeed (TAS) of 226 knots. To put it into possibly more familiar terms, we cruised at 262 mph, which is 7 mph more than the 685's performance specifications call for at 75% power.

Another benefit of pressurization became apparent on our descent into Raleigh. With the power back to 20 inches, I pushed the nose over until the airspeed indicator was at the high end of the green arc. The airplane hurtled toward the ground at 2,500 fpm; however, the cabin sedately descended at about 400 fpm. This is a real advantage in today's Air Traffic Control (ATC) system, where the controllers seem to apply "keep-em-high" procedures to all IFR traffic without regard for the effect rapid pressure changes can have on the human ear. We momentarily pulled the manifold pressure back to 15 inches for an even greater rate of descent. Even with that low power setting, we found there was still sufficient bleed air available to maintain the pressurization. Using so little power is not recommended, however, because in the long descents from altitude, the cylinder-head temperature is likely to get too cool.

Another day when the weather was a bit better we were able to get another 685 and do a little local flying to see if the airplane had any bad habits when flown low and slow.

Once again, having flown several hours in other aircraft between the two 685 flights, I was pleasantly impressed with the low noise level. You can actually converse with passengers in a normal tone. This flight session began with several ILS approaches at Dulles International Airport in the Washington, D.C., area. The best configuration for a stabilized approach in the 685 appears to be with one-half flaps at 120 knots. The drag produced when that big gear comes out of the wells at the outer marker makes it unnecessary to adjust power more than a couple of inches to maintain the glidepath. Again, here is where the stability of this bird pays off. A good approach can be flown in all but the most severe wind shear by making simple, small corrections with one finger bent around the yoke.

North American's new 685, like all Aero Commanders, is an excellent airplane for low-visibility approaches since the normal attitude of the plane in approach configuration is such that it would be virtually impossible to land on the nosewheel, even if visibility were so bad visual ground contact was never achieved. It is easy to make consistently good landings with the 685 due to the soft cushion provided by the large struts on the main landing gear. The fact that the pilot is separated from the main gear by a relatively greater distance than I am used to may have had something to do with this. (Maybe the landings just seemed good from where I was sitting.)

In a VFR pattern, 120 knots seemed comfortable, with an across-the-fence speed from 90 to 100 knots, depending on weight. At these speeds, it requires a somewhat wider pattern than most of the aircraft that will be encountered. This is necessary to keep the bank angles within reason, but the wider pattern is needed for spacing purposes at most airports anyway.

As I did a series of touch-and-goes, the one thing I didn't like about the aircraft showed up. The placement of the landing gear and flap levers is too close to the throttle quadrant, and if you grab them with your hand, rather than push from one direction or the other, there is a definite risk of scraping your knuckles on the quadrant. I suppose one can get used to moving controls in a different manner, but it seems sad that in an otherwise delightful panel layout and control configuration, North American Rockwell would compromise on such a simple thing.

The company believes the principal market for its 685 is the small corporation that wants fast, high-altitude capability but does not want to pay over a half-million dollars for a turboprop. Also, there will be some individual pilot-businessmen who will step up to the airplane from light and medium twins.

Whoever buys this airplane, whether for corporate or personal use, can be assured that in terms of luxury, speed, and comfort, the Aero Commander 685 approaches the ultimate in piston-powered aircraft. □

Flight-checked plane had a considerable number of special "goodies," including weather radar, air conditioning, and complete deicing protection.

