A SWIFTER CENTURION

Adding sizzle to Cessna's 210

BY MARK R. TWOMBLY

There I was at 9,500 feet, fresh out of ideas. The A36 Bonanza was running at maximum recommended cruise power: throttle full forward, propeller set at 2,500 rpm, and mixture precisely adjusted. The airspeed indicator needle quivered nervously at around 151 knots. The book says subtract about 3 knots for indicator error, so spinning the E-6B, I came up with a true airspeed of

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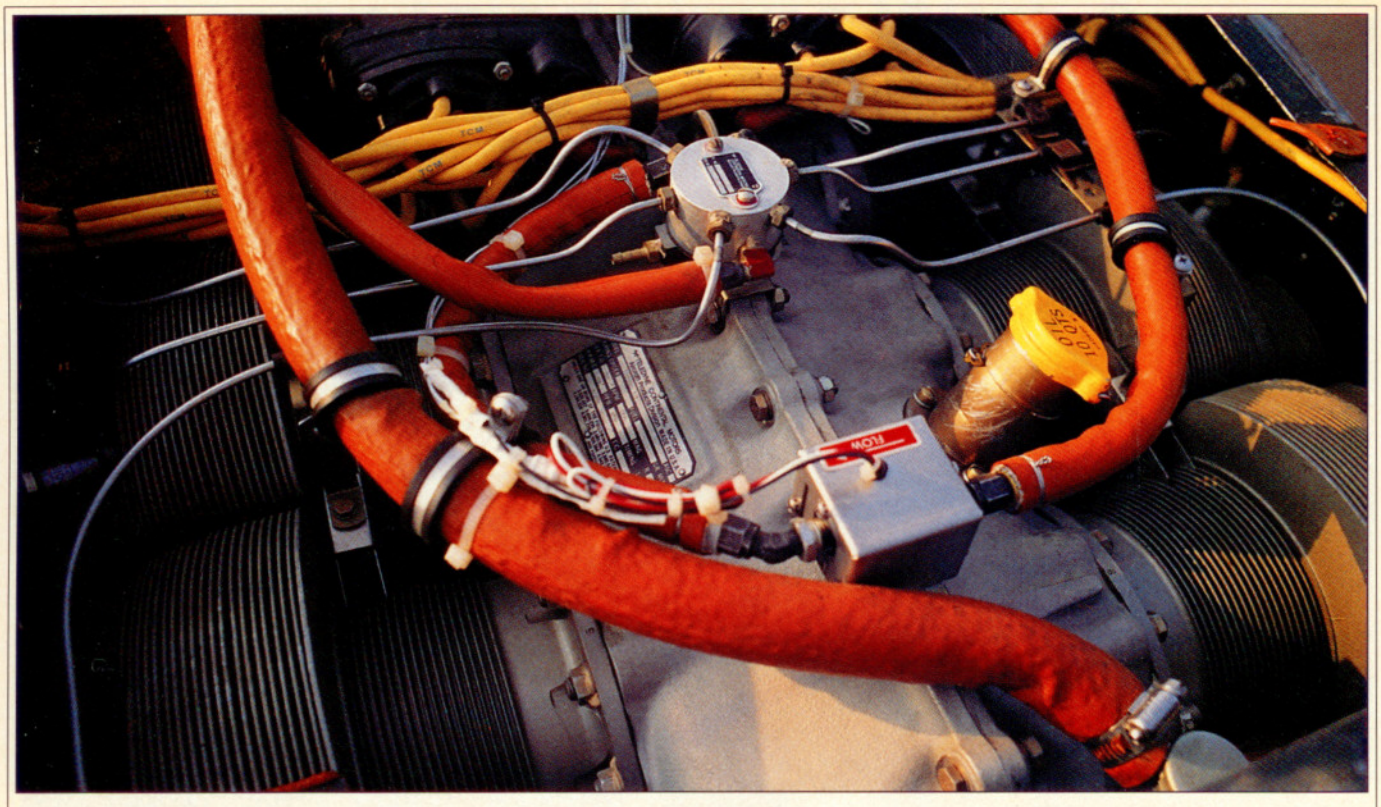


just under 175 knots.

Not bad for a normally aspirated single at this altitude, I thought. Trouble was, just off my right wing, a Cessna 210 was creeping past.

"Okay, we've got it figured out." Rich Gritter's voice crackled over the air-to-air frequency. "It took us four and a half seconds to pass you." ("Us" is Gritter and Don Godwin, president of Atlantic Aero, Incorporated.) Gritter, who as an aeronautical engineer is checked out on complex time/speed/distance problems, performed the calculations: "Four and a half seconds to go 27½ feet (the length of the Bonanza from tailcone to spinner). That works out to 6.1 feet per second, or 4.166 miles per hour, which is 3.62 knots. We're 3.62 knots faster," Gritter announced over the frequency. I prayed no one was eavesdropping.

It was time for extraordinary measures. I shoved the mixture forward an inch. Maybe, just maybe, there is an unpublished power setting for the A36 beyond best power. Military power!

Nope. The Bonanza continued to slowly fall behind. The race was over. Victorious, the 210 peeled off and headed for home.

I was devastated. An A36 Bonanza outrun by a Cessna 210. A high-performance luxury sedan done in by a family wagon. I couldn't blame the loss on an overweight condition, either—with just me in the cabin and the tanks half full, the Bonanza was about 250 pounds lighter than the 210. What will I tell the American Bonanza Society?

At the same throttle and prop settings, the 550 is a whole lot faster than the 520.

I'll say it was a square fight: two six-place singles powered by the same 300-horsepower Teledyne Continental IO-550 engine. The 550 is the stock engine in the Beechcraft—in 1984, Beech switched from the IO-520 to the 550 in the A36. Cessna Centurions, on the other hand, normally fly behind a Continental IO-520-L. All, that is, except N9078M, the 1977 210M that shut the A36 down. Atlantic Aero, in Greensboro, North Carolina, has been granted a supplemental type certificate to replace the 210's stock 520 with a 550. The first conversion was performed on 78M. Atlantic Aero has since done several more. Atlantic calls its re-engined 210 the 550 Centurion.

The STC also includes new Lord engine mounts, a new McCauley Black Mac propeller, Precise Flight speed brakes, new metal instrument panel, and re-marked fuel-flow gauge and tachometer. The STC covers normally aspirated Cessna 210K through N models produced from 1970 through 1984.

The price of the complete conversion, installed by Atlantic Aero, is $30,000. That includes exchanging the 520 for a factory-rebuilt 550 and the old prop for the Black Mac. The bottom line price is about $8,000 more than buying a factory-rebuilt 520, but most of the difference is due to the new prop. The STC requires use of the Black Mac.

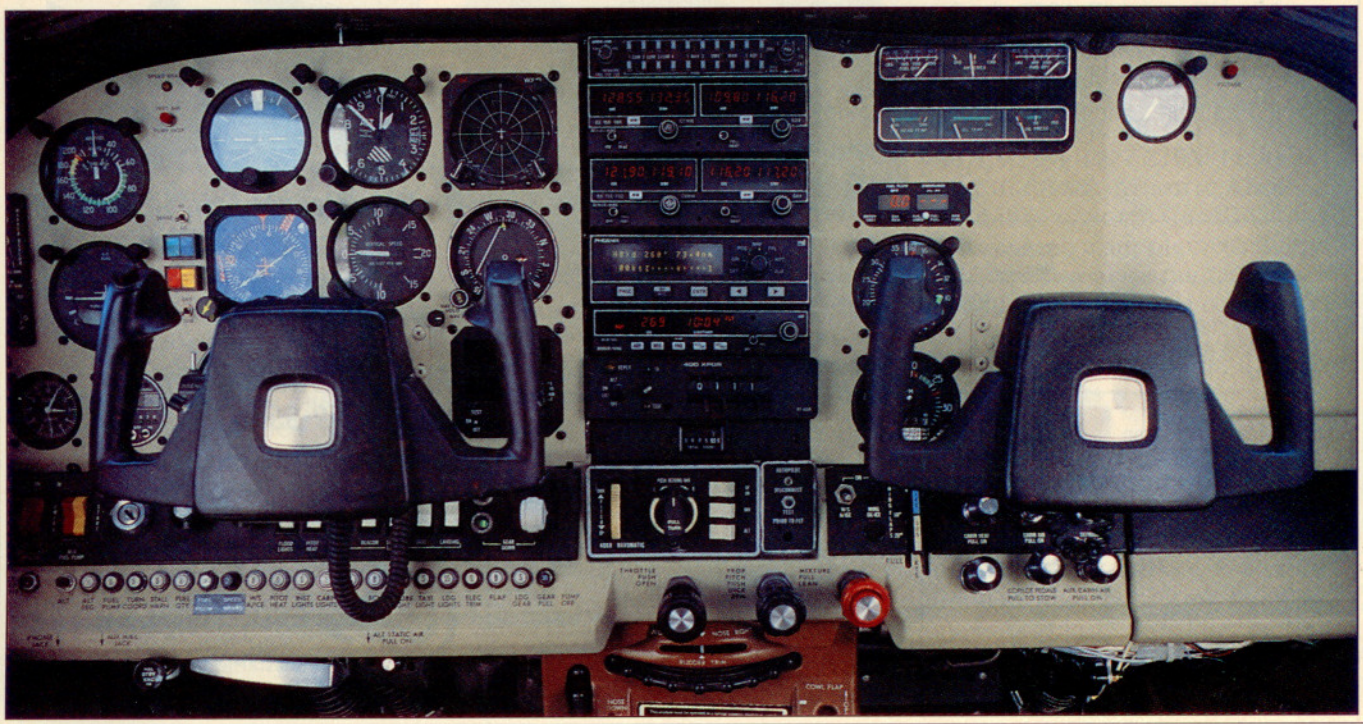
Atlantic also will ship the conversion kit for field installation. The kit costs $28,000.

The switch from 520 to 550 in the 210 was relatively easy to accomplish. The two engines are identical in most respects, differing principally in stroke—the 550's is about one-quarter-inch longer. The 550 also uses a different piston with shorter skirts to compensate for the longer stroke. When it debuted in 1984, the 550 had more cylinder hold-down studs and crankcase through-bolts than the 520, which made for better cylinder base stability and less torsional stress on the crankcase halves. About a year ago, however, Continental converted the 520 to the same stud and through-bolt configuration as the 550.

The speed brakes are an excellent tool to manage airspeed and descent rate.

The 30 additional cubic inches in the 550 over the 520 are important. Both engines are rated at 300 hp. The difference is the 550 delivers it at 2,700 rpm, while the 520 must be spun up to 2,850 rpm.

The 550 also can be run at max power continuously. It's perfectly acceptable to leave throttle and prop snugged up against the stops all the way to cruise altitude if you're busy with other things. The 520 is limited to five minutes, after which power must be reduced to a maximum of 2,700 rpm and 285 hp. Another way of looking at the two engines is that, at the same 2,700



rpm limit for maximum continuous power, the 550 delivers 15 more horsepower than the 520.

Continental guarantees that 300 hp is the minimum you'll get out of the 550; the engine may in fact deliver up to 5 percent more, or another 15 hp.

Another plus for the 550 is that the fuel pump compensates for altitude gain. The pump reacts to decreasing air density by moving a tapered rod to gradually restrict fuel flow. In the 550-powered A36, for example, fuel flow automatically decreases between three-quarters and a full gallon per hour per 1,000 feet of altitude gain. Temperature variations affect the extent of leaning. The automatic leaning feature strikes a good balance between the need to pour extra fuel into the engine for cooling in the climb, and the waste and harm that can result from running increasingly rich as the climb progresses.

Once at cruising altitude, the mixture is leaned by adjusting the exhaust gas temperature to 40 degrees Fahrenheit (about 20° Celsius) rich of peak. Continental says the 550 can be operated lean of peak EGT, but I avoid it. My experience in the A36 is that the 550 won't tolerate lean mixture settings—it begins to run rough just as the EGT goes to the lean side of peak.

The three-blade, 80-inch-diameter Black Mac prop used in Atlantic Aero's engine conversion is the same prop used on later-model turbocharged 210s.

The 550 Centurion's performance can be contrasted to a stock 520-powered 210 in several ways. Published performance charts for each show that, at the same fuel flows, the 550 Centurion is a couple knots faster than the 520. The reasons, apparently, are slightly better fuel specifics (which yield a tad more horsepower on the same fuel) and the more efficient Black Mac prop.

The basic conversion adds about 10 pounds to the weight of the airplane, due mostly to the speed brakes.

At the same throttle and prop settings, the 550 is a whole lot faster. For example, on one flight in 78M, I leveled at 6,500 feet and set up for maximum continuous power: full throttle and 2,550 rpm. True airspeed settled on 178 knots, 8 knots better than a 520-powered 210. Climbing to 9,500 feet, we recorded 180 KTAS, 12 to 13 knots faster than stock. There is no magic in the numbers: The 550 has more displacement and will produce more power, which makes the airplane go faster. All you have to do is give the bigger engine what it wants, which is more fuel.

That brings up an important caution. If you choose to fly the 550 Centurion at the same power settings you've been using in the stock 210 (and who wouldn't want to go 10 to 15 knots faster?), you'll have to adjust your flight planning to account for the higher fuel flows—about 2 gph at equivalent power settings—and thus reduced en-

durance.

Higher indicated airspeeds are why speed brakes are a useful component in Atlantic Aero's 550 Centurion package. Below 10,000 feet, you'll likely be cruising within a few knots of the 165-knot V_{NO}. On one of my flights with Gritter, I found it difficult to descend from 9,000 feet at 20 inches of manifold pressure (the minimum power setting that I'm comfortable with in a long descent) and still stay below the airspeed caution range. So I punched the yoke-mounted button to pop the electrically actuated speed brakes. After some experimentation, I found that I could use the speed brakes to reduce indicated airspeed 15 knots while maintaining the same rate of descent, or I could maintain airspeed and increase the descent rate 500 fpm. When extended, the speed brakes produce a rumble in the airframe. One glitch encountered in their use was an occasional asymmetric deployment that caused a brief uncommanded roll to the left.

I also used the speed brakes to control speed and altitude in the pattern and on final approach because the 550 Centurion was reluctant to slow down and come down there, too. Speed brakes can be used all the way to touchdown.

The flourish in the 550 conversion of the 210 is the cream-colored metal panel. It's far more attractive than the plastic-covered panel of old. The STC also includes new tachometer and fuel-flow gauges marked for the 550. Atlantic Aero also installed an Electronics International Ultimate Scanner engine monitoring gauge, Shadin digital-display fuel-flow computer, WX-10 Stormscope, Foster F4 Phoenix loran, and Bendix/King navigation and communication radios in 78M.

The basic conversion—engine, prop, speed brakes, and new tach and fuel-flow gauges—adds about 10 pounds to the weight of the airplane, due mostly to the speed brakes. With the tanks full (88 gallons usable), 78M still has 913.7 pounds of payload.

The 550 Centurion conversion is a nice package. The 550 engine is easier to manage than the 520 it replaces because there is no limitation on use of full power, and the fuel pump is self-leaning. The airplane also performs better, the speed brakes are an excellent tool to manage airspeed and descent rate, and the panel is much more pleasant to look at. If Cessna were still building 210s, it probably already would have incorporated the components of the 550 Centurion conversion as logical updates of the 210.

Meanwhile, I'm preparing to challenge Godwin and Gritter to a rematch just as soon as the Bonanza is repainted. The airplane is eight years old; the paint is chalky, and the surface is rough. Atlantic Aero's 550 Centurion, on the other hand, sparkles with new paint and probably a fresh coat of wax. That's worth 3.62 knots, don't you think? □

For more information about the 550 Centurion, contact Atlantic Aero, Incorporated, at the Piedmont Triad International Airport, Post Office Box 35408, Greensboro, North Carolina 27425-5408; telephone 800/334-2001 (in North Carolina 800/632-1009); fax 919/668-4434.