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KE FIZER

Cirrus SR22 G3

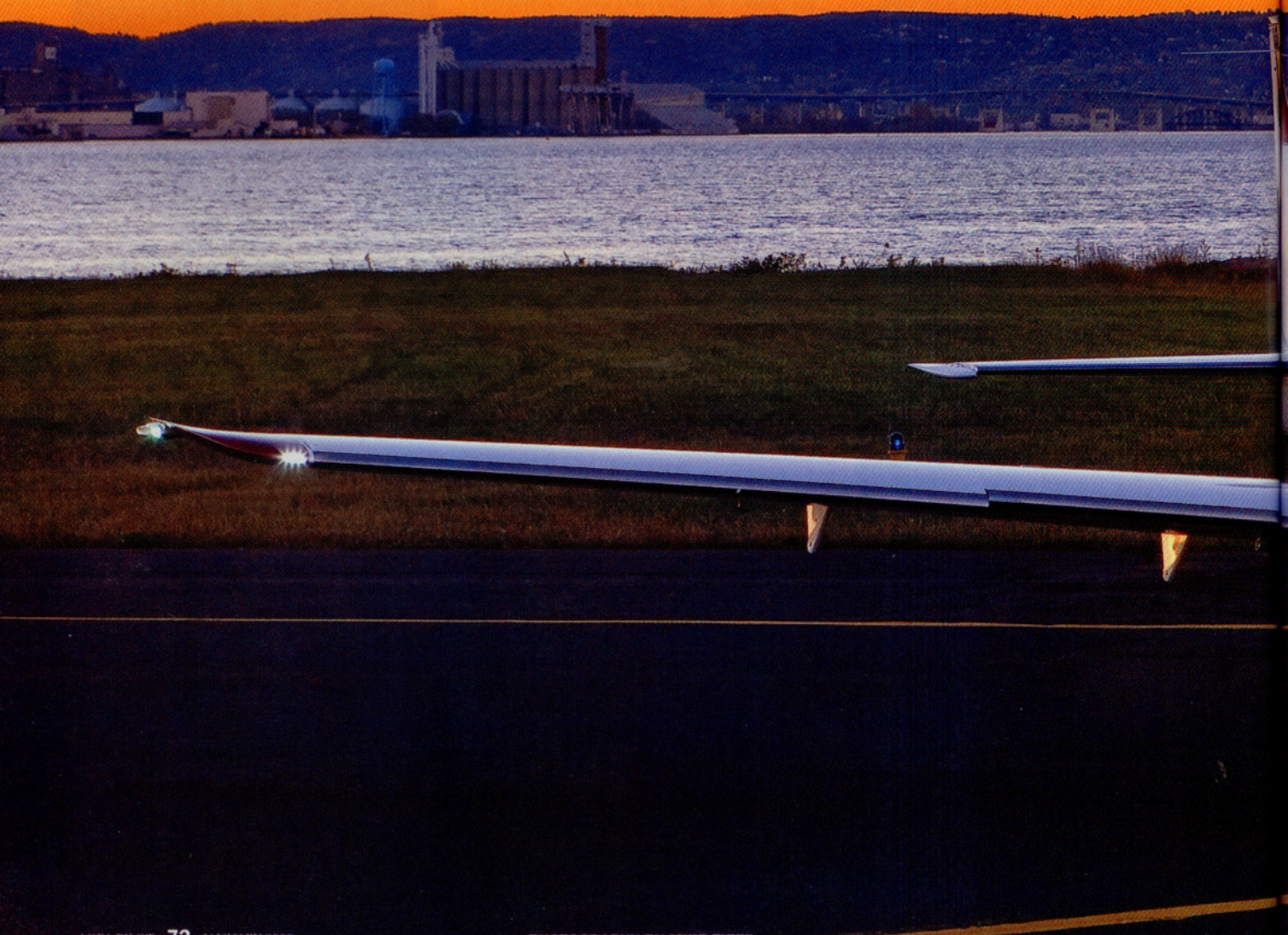
New set of wings

Continued innovation at Cirrus

BY JULIE K. BOATMAN

My first introduction to the Cirrus wing came in 1999. High over Lake Superior near Duluth, Minnesota, I flew with Gary Black in production number two of the company's SR20.

After a couple of pedestrian stalls where nothing broke—no nose drop, no wing drop, no nothing—Black asked for the controls to demonstrate just how this new wing worked. He pulled the airplane back deep into stall territory and then banked the airplane rather normally from left to right.



PHOTOGRAPHY BY MIKE FIZER

SPECSHEET

2008 Cirrus SR22 G3 Turbo

Base price: $532,990
Price as tested: $550,090

Specifications

Powerplant .....Tornado Alley turbonormalized TCM IO-550-N, 310 hp @ 2,700 rpm
Recommended TBO .....2,000 hr
Propeller.....Hartzell ASC propeller, 3-blade
Length .....26 ft
Height .....8 ft 9 in
Wingspan .....38 ft 4 in
Wing area .....144.9 sq ft
Wing loading .....23.46 lb/sq ft
Power loading .....10.96 lb/hp
Seats.....4
Cabin length .....10 ft 10 in
Cabin width .....4 ft 1 in
Cabin height ..... 4 ft 2 in
Empty weight ..... 2,330 lb
Useful load .....1,070 lb
Payload w/full fuel .....518 lb
Maxgross weight.....3,400 lb
Fuel capacity, std .....92 gal usable 552 lb usable
Oil capacity ..... 8 qt
Baggage capacity .....130 lb

Performance

Takeoff distance, ground roll .....1,028 ft
Takeoff distance over 50-ft obstacle..... .....1,594 ft
Max demonstrated crosswind component .. ..20 kt
Rate of climb, sea level .....1,400 fpm
Max level speed, 25,000 ft ..... 219 KTAS
Cruise speed/endurance w/45-min rsv, std fuel (fuel consumption) @ 86% power and 5,500 feet ..... 176 KTAS/4 hr/716 nm (17.5 gph)
@ 75% power and 25,000 feet ....211 KTAS/3.9 hr/823 nm (17.5 gph)
@ 55% power and 25,000 feet ....180 KTAS/5.5 hr/1,000 nm (11.8 gph)
Max operating altitude.....25,000 ft
Landing distance over 50-ft obstacle ....2,344 ft
Landing distance, ground roll .....1,141 ft

Limiting and Recommended Airspeeds

V_X (best angle of climb).....80 KIAS
V_Y (best rate of climb) ..... 100 KIAS
V_O (operating maneuvering) @ 3,400 lb ....133 KIAS
V_{FE} (max flap extended).....104 KIAS
V_{NO} (max structural cruising).....178 KIAS
V_{NE} (never exceed) .....204 KIAS
V_R (rotation)..... 73 KIAS
V_{S1} (stall, clean) .....66 KIAS
V_{SO} (stall, in landing configuration)..... .....61 KIAS
V_{PD} (maximum parachute deployment speed) .....133 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 Cirrus Design, 4515 Taylor Circle, Duluth, Minnesota 55811; telephone 888-750-9927; www.cirrusdesign.com.

I just sat there, kind of stunned.

When Cirrus engineers delved into designing the 2007 SR22 G3 series, the focus returned to the wing. Updates to the airplane to create the G2 had centered primarily on the fuselage (see "Cirrus SR22-GTS: Fast Company," April 2005 *Pilot*). But that beautiful wing, with its NASA-inspired cuffs and sculpted lines, emerged from the Cirrus Design skunk works even better this time around.

Which is how I found myself once more flying high above Duluth, nose up to the blue above, banking left and right, and smiling.

The cruise on top

Lenny Brunette, corporate pilot for Cirrus, met me at St. Paul Downtown Airport in N255SR, a turbo G3 model, which would serve as both my ride up to Cirrus's headquarters in Duluth and the airplane to put through its paces for this report. With a ceiling of roughly 2,000 feet msl (nearly 1,300 feet agl) and tops at 4,500 feet, we made a plan to punch up and through to enjoy an on-top flight back to the mother ship.

For start up and taxi out, Brunette showed me the latest flow patterns. Cirrus has gone through great pains to dis-

Spar wars

The technology behind composite structures constantly evolves—and with this evolution comes opportunity. The people of Cirrus have not yet felt comfortable resting on their laurels, so when engineers identified benefits that would result from moving to a carbon fiber spar on the SR-series aircraft (the original spars were constructed of uniweave fiberglass), the change was made.

What makes engineers confident that the composite spar (whether carbon fiber or fiberglass) can carry the load as well as or better than traditional metal spars? Design and testing—the same hard data that has allowed for the structures to evolve. In the design of the G3 wing spar, the team tested four wings to one to two lifetimes of load, and then tested to structural failure. In another series of tests, engineers placed defects within the spar at critical points—larger defects than any introduced in production—and tested the spar to ensure it could still meet the original load-bearing specifications.

So far, Cirrus aircraft have clocked more than 2 million fleet hours on more than 3,500 airframes without a single in-flight structural failure of the spar. More than 400 aircraft have been delivered with the new carbon fiber spar—which is more expensive to build yet weighs less (it now weighs 54 pounds).

But the real test? After an encounter with severe clear air turbulence in August 2006, the pilot of an SR22 noted thin lines of paint missing from the tops of the wings, slowed the airplane, and made a precautionary landing, according to the preliminary NTSB report. The aircraft was tested by Atlanta Aerospace Corporation, and according to sources at Cirrus, data obtained from the primary flight display showed that the aircraft sustained a G load well above Part 23 design limits. The load caused the engine mounts to buckle, but the spar stayed intact. The pilot landed, and, according to an engineer interviewed, "we got to decide what to do with the spar."

—JKB

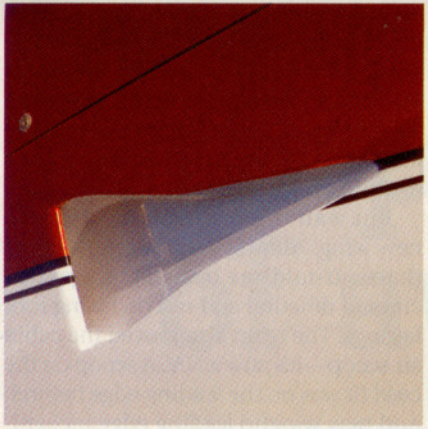
till down procedures to the nub to simplify cockpit tasks. To start the warm engine, I turned on the battery master switches and flowed right from there to set the lights, mixture and power lever, and fuel pump to normal, and then I cranked the starter. The redesign of the master switch panel eliminated the restricter bars across the switches—the switches are now recessed to prevent inadvertent activation. Also, the switches are backlit for better visibility at night.

As the multifunction display in the Avidyne FlightMax Entegra avionics suite came online, it displayed the fuel status page and then three "pilot preflight" pages. The first delivers a chart outlining a risk-management matrix designed to set benchmarks for launching a particular flight in given weath-

er conditions with a given pilot in command. For example, if the pilot doesn't have recent instrument flight experience in type, flight into marginal VFR or IFR conditions is flagged—even if the pilot is paper legal. The second page gives density altitude operational information, reminding the pilot of the degradation in performance under high-temperature conditions at high-elevation airports. The third page preflights the pilot by asking "I'm safe"-style questions regarding illness, medication, stress, alcohol, fatigue, and nourishment (eating). It's an interesting concept—but I fear that, like a safety seminar, it will do wonders for already prudent pilots but fail to reach a certain segment of our population.

The straight scoop: Slips are a blast. The G3 slips like it's on rails.

With temps just above freezing at the surface and the Tornado Alley turbonormalizing system doing its job, climb rate at times topped 1,400 fpm during our short step up to cruise at 5,500 feet on top. For the trip up to Duluth, we had 2,510 rpm and 30 inches manifold pressure set, producing 86-percent power. An inversion aloft drove the outside air temperature up to 7 degrees C on top, delivering a true airspeed of 176 knots at 17.5 gallons per hour fuel flow. An "engine box" on the primary flight display, introduced late in the G2 model run, gives the highlights. At this power setting, turbine inlet temperature stood at 1,585 degrees F, with exhaust gas temps near 1,500 degrees F and cylinder head temps loafing around 326 degrees F. The



An entire roster of small changes adds up to a new SR22 (from left): high-intensity recognition lights on the wingtips, the repositioned TKS fluid filler port on the left wing, weeping stall strips on the leading edges, the relocated NACA air scoop on the cowl, and the recessed rocker switch panel on the pilot's side instrument sub panel.

Continental IO-550-N sure seemed happy in lean-of-peak mode.

The G3 series comes with Garmin GNS 430Ws with WAAS (Wide Area Augmentation System) capability. This feature allows the pilot to fly LNAV approaches with a WAAS-generated glideslope (possible with nearly any nonprecision approach that has a GPS version), as well as LPV approaches.

What's in that wing?

After loading and executing a no-brainer GPS Runway 3 approach into Duluth, we were soon on the ground taxiing up to Cirrus Row. The facilities have expanded considerably since Black and I came back from that blustery February flight several years ago. Now, Cirrus SR20s and SR22s line the ramp—and many are in color! From the all-white airplanes that first launched the fleet to the linen-colored birds around the Centennial of Flight, Cirrus has long presented a clean, sharp design—but a little heavy on the vanilla. With the G3, you can pick your airplane with the top of the fuselage painted gold, silver, imperial red, or gulf blue. Or you can get the entire airplane wrapped in silver or gold.

The Continental IO-550-N sure seemed happy in lean-of-peak mode.

But it's what's inside that counts, change-wise. With a purported 700-plus updates and improvements to the airplane and systems, I asked Brunette what's really different about the third generation of the airplane. His short answer: the wing.

To find out more, I talked with sources in product engineering. They are passionate about the airplane, particularly about its integrity (see "Spar Wars," page 75). The big news? As part of the redesign, the integral fuel tanks gained 11 extra gallons of usable fuel—for a total of 92 gallons.

But wait, there's even more to the new wing. Among the noticeable-now-that-you-told-me design changes: increased dihedral and restyled wing root fairings. The team also moved the cabin air scoop—it's now a NACA scoop on the cowl (it was on the leading edge before). And new wingtip leading edge recognition lights come on with the landing light—plus the wingtip navigation lights now use LEDs (light-emitting diodes).

On the left wing's upper surface, you'll find the relocated filler port for the TKS fluid deicing system, with a keyed entry—and a larger key than that used for locking and starting the airplane, no less. Cirrus has increased the size of the TKS reservoir (now 3.5 gallons); plus, the weeping-wing strips extend farther along the leading edge, from wing root to wingtip, complete with a weeping stall strip. A slinger ring still delivers the fluid to the prop.

Step back, and you'll see that the airplane is two inches taller because of reclocking of the main gear—the angle to which it attaches to the fuselage is less, making the gear stance narrower as well.

Maneuvering flight

Brunette and I took the G3 out for some fun flying in the local Duluth area before shipping me back to St. Paul. That's when I got to feel the results of the redesign—in some subtle and some not-so-subtle ways.

The first noticeable change for the pilot is that there's no more rudder-aileron interconnect. Instantly, taxiing is less cumbersome—and after we got into the air, we climbed up high so I could sample the G3's new handling qualities. The straight scoop: Slips are a blast. The G3 slips like it's on rails. How do I know? We engaged the elevator function to come back down through the scattered layer after maneuvering on top through steep turns, lazy eights, and stalls.

The SR22 allows you serious margin in slow flight, with fairly crisp aileron response even with the stall warning horn blaring. That wing's still doing its thing, just a little bit better than before. AOPA

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