

FLYING

World's most widely read aviation magazine

February 1968/75¢

Pilot Report:

**Cessna's CARDINAL,
first of a new generation.**

Special Report: Part II—

**Flying proposes a dramatic solution
to Air Traffic Control problems.**





**Sleek snout,
a great huddle of
a windshield
and a wing far enough
aft that you forget
about it: Cessna's
Cardinal makes
like an airborne
GT car.**

by Archie Trammell

The new Cardinal

BIG BUNCHES OF PEOPLE are going to dislike Cessna's new Cardinal. Intensely. Most of them will be the competition.

In December, after a brief introduction to it at Cessna's initial press showing, we gave you our first impressions of the Cardinal.

We had some reservations.

Since then, we've flown the number-three airplane, 2203 Yankee, for 16 hours and 30 minutes over a long weekend. Thanks to the caprices of weather and our schedule, we saw the airplane at its worst. We flew it 6:40 in winds to 60 knots aloft with surface gusts to 39; 3:30 at night in turbulent air with patches of unreported weather thrown in; 2:20 on solid instruments, the last 30 of it in icing conditions.

Our reservations are gone—but not for the reasons you may think.

In December we cautioned against comparing the Cardinal with other airplanes. To do so is to miss the significance of it altogether, for the Cardinal is an entirely new idea.

But everyone seems to insist. So, since we must, let's.

As airplanes go, the Cardinal is nice. It's an important advance over previous offerings in its class. When compared airplane to airplane, the big thing in its design is the height of the wing. The Cardinal, like the Skyhawk, has the high-wing advantage that allows you to drain sumps (via optional cup and wire prong valves that should be standard) and check the undercarriage without getting down on your knees and dragging your coat-tails through slush and grease on the ramp.

The Cardinal's wing, though, is also low enough so that an average-size pilot can pull fuel cell caps and wet a finger without first hunting for a soapbox. And—hurray!—they've finally removed the fuel strainer drain knob from its silly position on the panel. It's now mounted next to the oil dipstick, under a little door on the right side of the cowling.

The net effect of this is to put the Cardinal years ahead in eliminating the prime excuse for power failures—inadequate preflight fuel system inspection.

Now if Cessna would only provide a way to look into the engine compartment for oil leaks, chafed wiring, loose baffles and other potential problems, they'd be reaching for perfection. The Cardinal's cowlings is a sculptured work of art in metal and fiberglass. It's mounted to the firewall on a dozen noise- and vibration-quenching cushions of rubber. But you have to practically be an A&P to get inside and admire that colorful "Blue Streak" 150-hp engine by Lycoming.

Some of the places on the nuts and bolts level are extremely soft wing and stabilizer tips that spring back to shape should you taxi into a hangar door; an improved latch on the baggage door; a single exhaust stack on the right side so the natural direction of the propwash will curl that ugly soot streak down the belly instead of along the left side; retracting beddown rings; straight and clean trailing edges in place of corrugations; internal hinges on all surfaces; ground adjustable tabs on the ailerons; elimination of that unsightly flap gap on earlier Cessnas; metal-to-metal seat belt

The wings offer no visible means of support on this strutless wonder—the look all of Cessna's high-wingers will probably soon sport. And the Cardinal's leading edge is low enough to enable ladderless gas checks.



latches; fuel shut-off valve separate from the selector; rocker-type switches; rheostats for panel lighting; single-web cabin air/heat control; prepositioning flap switch.

The list is impressive. About the only debits you'll find are thin skins at the tail that show evidence of a weight reduction program, and, for the first time ever in a single-engine Cessna, they've had to doctor the wing with stall strips.

The pipe landing gear legs are the biggest hardware improvement. Developed by Steve Mittrani, who also gave us the flat spring gear legs of former Cessnas, they've been around on homebuilt for two decades. They haven't been used on production airplanes because of manufacturing problems. A plate steel pipe

won't do; Cessna uses a machined, concentric tapered tube. Cardinal engineers and a vendor worked more than a year to get them just right.

It was worth it. Few other vehicles, terrestrial or airborne, give as good a ride on the ground. Lock a brake, the gear springs back, swinging the wheel out and the airplane follows it around, turning about a point aft of the front seats.

And it's an exceedingly stable type of gear. We landed, taxed crosswind and downwind, and departed Ponca City, Oklahoma, in winds so strong we could hardly push the Cardinal's big doors open against it, and we didn't bend anything. We landed on Cessna's narrow runways in a gusty 28-knot, 20-degree crosswind

with no more technique required than was necessary departing a few minutes later in a squally low-wind.

In December we mentioned a tendency for the Cardinal to skip on landings. This turned out to be a result of overcontrolling at too high a touchdown speed. The Cardinal's stabilator is powerful, hold the wheel back after touchdown and you'll drag the tail skid. Once we got the feel of it, the skip disappeared. And one gusty night in Dallas, we proved conclusively that the airplane does not bounce on a landing.

We also mentioned in December that the gear takes the cross out of crosswinds. What happens is that as skid leads build up on the downwind line, the gear springs back, which turns the wheel into

the skid and dampens the embarrassment, almost like fancy crosswind gear. When the Cardinal is compared to other airplanes left front seat to left front seat, its true significance is slighted most. In fact, if you've faithfully read all the pilot reports, you're probably wondering what's new. Even Cessna is hedging by coining the Bayshek, but with the same 250. Licensing that powers the Cardinal. The performances are almost identical. For 1,250 more dollars you get a bit more quietness, considerably more comfort and room, and strutsless styling.

You also get visibility—great visibility. And improved ailerons. The Cardinal's ailerons are superb. Even our aerobically friends like them. We tried and tried to

get an aileron stall and couldn't. With the airplane buffering at the break, you can rock the wheel stop to stop, and all you get is a snappy roll and a high sink rate.

At 2,200 pounds and rear seats empty, the airplane is approved for chandelies, lazy eights and spins. We tried some of each and hated to stop. You sit so far forward that you seem to be wearing the wings on your shoulders. Doing chandelies and lazy eights, you become a pull, or a hawk—or a cardinal. But watch that airspeed. The airplane is clean. Let the nose get down and it goes.

Spins are difficult to get into. You must have the wheel full back and kick it into the spin just before the break. Eeeeee then, if you relax back pressure



the thinnest bit, the airplane pops out into a spiral.

Stall characteristics are superb. The airplane pleads with you, reeks you, frightens you, in an effort to keep you out of trouble. The stall warning is a pitiful pneumatic wail, like a doll's voice; stick forces get higher and higher, the nose points up at a scary angle. If you insist on carrying it farther, the airplane sets up such a buffet that the seat literally paddles your backside in warning that a stall is imminent.

We slipped the airplane with no ill effects. The owners manual, however, cautions that slips are prohibited with full flaps due to a downward pitch at certain speeds.

Slips aren't really necessary. Quarter flaps can be applied at speeds to 103 knots (119 mph), full flaps at 93 knots (105 mph). The main thing on landings is to get the airplane slowed to 65 or 70 knots (75 to 80 mph) in the approach. Otherwise, it'll fuel. Our instructor friends say overflights are common on Cardinal checkouts.

After touchdown, a quick swipe at an airbrake-shaped knob brings the flaps up. The old self-centering switch is gone. Now the flaps go to whatever position you set the lever. There's a notch one-quarter of the way down the stick. So, on takeoffs, you'll soon get into the habit: You open the throttle, slip the lever down going through 45 knots (52 mph) and rotate.

We're not sure whether this or the new trim location is the best feature. When your right hand is on the throttle, the trim wheel is just under your thumb, and you can roll it up or down with a deft flick. Trimming ease approaches that of a button on the yoke.

Good thing, for the Cardinal, in common with all stabilator-equipped planes, tends to be uncertain in pitch. Wheel forces, delightfully delicate at maneuvering speeds, are so heavy at cruise that you soon have a sore left arm in rough air from tugging or pushing each time the plane is knocked off trim speed by a gust. In rough air you'll also feel gusts feeding back through the aileron circuit.

In spite of this, the Cardinal is a good instrument airplane. Flight instruments are in T presentation (standard on all Cessnas in 1968). Though we don't recommend solo instruments with one radio and no autopilot as a regular order of business, we enjoyed the Cardinal's gauges from Dallas to Ponca City. Even after we began picking up ice.

With a half-gallon of time on the leading edges, 43 Yankee maintained its usual 115 knots (132 mph) true at 75

percent at 7,000 feet. The windshield stayed clear and we could detect no differences in stabilator responses.

One caution on flying the Cardinal in freezing: When the temperature is near freezing. Because you sit under the leading edge, it's natural to lean forward and look back down the leading edge for ice—the single most effective head movement to induce vertigo. We had our first experience with “the leans” on this flight.

Of course, neither do we recommend flying in ice without proper equipment. When you start picking it up unexpectedly, though, it's great to know that the plane you're flying gives no cause for concern. It gives you time to lose our cool in the Cardinal in any case. Each time we flew in moisture, it entered the leading edge intakes and came out the overhead vents as a refreshing spray.

When critically comparing airplane to airplane, the Cardinal stacks up as we've come to expect of a new design. It's a better machine with a higher price tag. When measured against the Skyhawk at night, however, the Cardinal comes up second best. Landing and taxi lights are so far recessed into the left wing tip that they don't light up ramp and taxiways as they should. Panel lighting is good—so far as it goes. It doesn't go far enough. We had to resort to a flashlight to read the engine instruments and tachometer. Reflections from ground lights off the backside of that long, slanted windshield are force over a large city. One night, over sparsely settled Oklahoma, we climbed into an overcast thinking the reflections of scattered lights below us were stars above.

The Cardinal hardly seems anything to bemoan the competition. They'll stretch their cabin seat wide, or add another window, or switch to BTO power levers and be back in favor with aviator types. But this is just the significance of the Cardinal: Its successes do not rest on plot appliances alone.

Up to now, the personal airplane business has been trying to grow by bigging at its own bootstraps. The game has been to entice people to learn to fly. Then, once they begin to fancy themselves aviators, we entice them further with planes that appeal to pilots.

But look what Cessna has done. In December, we said the Cardinal is the finest automobile flying. It's low, with superwide doors that swing out 90 degrees. Then you can approach it sprightly in front of the leading edge, sit down, swing your legs in and go. In fact, it's easier to get into than some automobiles.

The interior is big, comfortable and

well lighted. The luggage compartment is enormous. And those crank-out windows not only lend an automobile touch, they keep the passengers from getting half-nauseous from the heat even before you take off.

The exterior is the thing, though. Cessna won't reveal who their stylist was, but it's certain he's a genius. If you'd never heard of the Cardinal, and were to see it briefly in profile, you'd be hard pressed a moment later to say whether the wing is high or low, Cessna has deemphasized the “plane” in airplane.

As a result, you seldom hear comments about how it looks as an airplane. A middle-aged gentleman in Dallas told us it looks just like Chevrolet's Impala. In Tahlequah, Oklahoma, where we took it to see the National Collegiate Polo-chest Meet, one of the college kids looked at that squared-off, boxy rear end, the sloping windshield, the big rear window, and said, “Gee, a fastback Mustang that fits.”

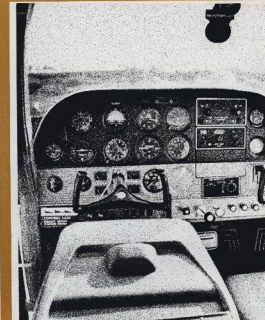
Obviously, the Cardinal was not envisioning them on a pilot-to-airplane basis. Obviously, they weren't seeing an airplane, with all the complications of giving up their present leisure activities and guiding their interests in a new direction that flying presupposes. They were seeing a better way to pursue their present interests—the next logical move up in getting from here to where the action is.

When viewed in this light, it's not so important that the Cardinal is only a little faster than the old 110-knot (126 mph) Skyhawk. The thing is, here's a sportsman hunting or going to work—relatives machine capable of almost doubling a man's turnpike cruising speed.

Nor is it important that the lighting isn't perfect. That can be fixed. The thing is this airplane has a CG range so wide you can hardly land it wrong. 103 Yankee could carry full load, 120 pounds of baggage, two 200-pound passengers in the rear seats, no one in the right front seat and a 66-pound pilot and still be within CG range.

And finally—to forestall the thing pilots will complain about most—it's not so important that the Cardinal doesn't take off and climb like a 310. The thing is, with only 150 hp the Cardinal will use but 1,730 feet of Aspen. Cessna's 6,500-foot turnaway, even on the warmest skiing day, and it'll climb 295 feet per minute after liftoff. Besides, everyone knows bigger power options are on the way.

So, our reservations are gone, not just because the Cardinal is a better airplane. But because it's the biggest threat yet to the two-car family. ✦



Easy entry and sweeping cockpit visibility are the Cardinal's pride, but ground lights reflected back by the steeply raked Plexiglas complicate night flight.

Cessna Cardinal/177			
Specifications	Basic price \$14,900	Performance	Flight characteristics
Engine	McCulloch 4-cyl. 76-hp, 1800 cc	Takeoff distance	Control response (climb)
Propeller	McCulloch fixed pitch, 76 in.	Takeoff distance over 50 ft.	Control response (slow flight)
Wing span	35 ft. 7 1/2 in.	Rate of climb	Hands-off stability
Wing length	26 ft. 11 1/2 in.	Service ceiling	Stall recovery
Weight	913 lb.	Maximum speed	Flot utility
Wing area	173 sq. ft.	(Model 177)	Visibility
Wing loading	12.6 lb./sq. ft.	Cruise speed (75% power)	Seat adjustment & comfort
Passenger & crew	4	(at 8,000 ft.)	Accessibility of switches, etc.
Empty weight	1,415 lb.	(Model 177)	Instrument lighting
	(177-1,360 lb.; 177-1,010 lb.)	Economical cruise (65% power)	Cabin comfort
Gross weight	2,350 lb.	(Model 177)	Entry-exit ease
Power loading	(177-2,350 lb.)	Wings (at max. cruise)	Front seat room
Fuel capacity	69 gal.	Wings (at max. cruise)	Rear seat room
Oil capacity	8 qt.	Wings (at max. cruise)	Ventilation
Baggage capacity	120 lb.	Wings (at max. cruise)	Maintenance access
		Wings (at max. cruise)	Engine
		Wings (at max. cruise)	Electronics and instruments