Cessna Cardinal article

I wrote this article at the request of a national aviation magazine. It was accepted for publication, but they put off publication when every other magazine seemed to publish a Cardinal article in the same month! Now that magazine appears to be defunct, so you have the chance to read it here. Enjoy!

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What are you looking for in an airplane? Need a little more speed? More payload? Range? Pizzaz?

Our reason for moving up was simple arithmetic. For the two pilots in our family the prospect of a visit from the stork (in fine flying tradition) meant time for the first step in family planning: more seats in the family airplane.

We thought we knew what we wanted, but as we walked around Oshkosh looking for Cutlass owners to talk to we began to realize two things: No one flying a Cutlass to Oshkosh that day actually owned it and most of the flying families owned Cardinals.

Talking with these families we discovered a lot of reasons to be shopping for a Cardinal:

Cardinals are fast. On my first flight in a fixed gear Cardinal I departed behind a 172 and nearly buzzed its tail off as I steamed past. They really move along! Book speeds of 145+ knots for the RG and 132 knots for the down-and-welded version are routinely achieved by well-rigged post-1970 Cardinals.

Cardinals are big inside. With 48 inches of shoulder room and more legroom in back than a coach airline seat, everyone in a Cardinal has a comfortable ride. And the baggage area has enough room for a week of Oshkosh camping without leaving part of the the family at home.

Cardinals are easy to get in and out of. Big doors, seats that don't have to be moved to get in and out and the Cessna tradition of a door on each side makes getting in and out a breeze. Although if that breeze is from the rear the doors can turn into sails in a hurry.

Cardinals are easy to maintain. The average 172 mechanic may scratch his head on occasion, but there are no big surprises in the Cardinal design. Deep down inside it is still a stone-simple Cessna with a four banger out front, and the Lycoming IO-360 has the advantage of sharing ancestry with Cessna's newest birds so the future prospects for parts and support are good.

Cardinals are inexpensive to maintain. Think of it as a larger 172 with one or two more systems. Cowl flaps and CV props are rarely big maintenance items and everything else is about the same. The standard discussion of advantages and costs of retractable gear is left as an exercise for the reader: Cardinals come both ways.

Cardinals are efficient. Turning an easy 125 knots on 9 gallons an hour or 142 on 10 in the RG is very nice. I've flow trips side-by-side with a Cessna 150 and burned less fuel. On another occasion I beat out a Cessna 170 on both gas (slightly) and time (substantially) over the same trip.

Cardinals are easy to fly. Pitch is solid at cruise but light in the flare. The roll response is crisp and responsive, much better than a 172. It is a his-and-hers airplane that will provide enough zoom for him yet a low-muscle pattern for her.

Cardinals are fun. They achieve the balance between stability and sportiness that designers hope for, solid enough to be named among the best IFR platforms but responsive enough to beg for lazy 8's and random swooping to your favorite flying tunes.

Cardinals have exceptional visibility. Tradition says you can't see down in a low-wing or up in a high-wing, but Cessna cleverly put the Cardinal wing far enough back, or the seat far enough forward, that by leaning forward a little you can look straight up. That's a nice feeling in a turn or just before the aforementioned swooping.

Cardinals look great! The lines of the windshield, the lack of struts, the continuous curve of the fuselage are all very compelling. The view I like best is tail-on where the smooth transitions can be seen, with rear-fuse lines faintly reminiscent of the Lancair or Staggerwing.

But the real test of an airplane is how theory, legend and reality come together in the air. Especially for today's demanding pilot (If I don't like it I'll build my own!)

If you're like most of us, the Cessna 150 or 172 is a familiar reference point, as well as a common plane from which to step up to a Cardinal. So let's take a `76 RG for a flight from a 172 pilot's perspective.

Preflight feels right at home. All the parts are in their usual places, with a couple of extra things like nose door integrity and dual status ports to review. The ailerons are missing those hinge pins and their little clips, the Cardinal uses real bearings. Dual tank drains, dual belly drains and a gascolator drain make this one of the most fuel-drainable Cessnas ever.

Look out for the trailing edge, the Cardinal wing is lower to the ground than a 172. At least it won't give you the trademark Cessna Diamond scar on your forehead: the flaps and ailerons have flat skins. You'll be thankful for this at wash - and - wax time, too.

The book useful load of up to 1026 lbs, although frequently reduced by radios and other toys, is enough for most situations and the highest useful load of any factory 200hp four-seater. Full seats with standard people leaves you just short of a full long-range tank. My wife and I can take along a normal (not just standard) couple and a few bags, but if everyone has ski gear something has to stay home: either a person, gear or some fuel. With 6 hour tanks you can usually leave fuel home and complete the mission.

Open up and slide in, no need to move the seats. A standard instrument T and radio stack will greet you, and there's room between the front seats for a chart file. This was my panel, which was exceptional in 1984 but there are far finer panels in the fleet these days. In fact mine is much improved also: check out the details here.

At night you'll appreciate the larger number of lighting options. Post, glare-shield and overhead lights are available in many Cardinals, enough to make you wonder how you ever flew at night in most 172's. The switches and knobs may be lighted by an optional lighting panel. And for true class, check out the courtesy lights that light the ground below each wing for entry.

Ready to start? Select `both' on the left-both-right-off fuel selector, prime with the electric fuel pump and crank with the mixture off. The Lycoming 4-banger is as strong as they come and a predictable starter. Mixture in when it fires and perform the standard Cessna panel tidy-up. Take a moment to enjoy the throaty rumble of 200 horses.

Complexity starts to show up in the pre-takeoff routine. Be sure to cycle the Constant Velocity prop in the runup and check to be sure the cowl flaps are open and the gear down. A squat switch will keep the wheels under you even with the handle selected `up', but only until the nosewheel gets light. Then you may find yourself on two wheels before you're ready.

Dial in 10 degrees of flaps for takeoff, as the book recommends. The flaps move back before they move down, so adding flaps adds wing area. It also moves the center of lift back a bit.

Before you go, remember that full RPM does not mean full power. Plan to scan the tach, manifold pressure and fuel flow to be sure you're getting all the power you should. A table on the console displays reminders of best power settings for high altitude takeoffs.

Line it up, add throttle gently and feel those horses pull. The look and feel of takeoff are very 172-like, it just happens faster with a little more rudder needed for P-factor and torque. Lighten the nose at 55 knots and it will fly itself off around 60. At my airport elevation of 850 feet and with a full load, 1,800 feet of runway will easily do the job on a standard day.

The elevator is a little lighter than a 172 at rotation and a little down trim will be needed to hold the best climb angle speed of 82 knots. Fully loaded on a standard day you'll see 900 FPM of climb at low altitudes.

This is the busiest moment in a Cardinal RG driver's VFR life, with power, prop, mixture, gear, flaps and cowl flaps to think about. At first this will take a few minutes but in time it becomes second nature. Just put every gauge at the top of the green and you'll be close enough to start with. And leave a few moments to ack the handover to departure that can drop in the middle of this routine.

Once cleaned up ,many Cardinal pilots would go to a cruise climb configuration: pull the prop to 2,400, manifold pressure to 23 inches and verify flaps in. You will settle into a 300 FPM climb at 120 knots TAS, in good shape for a climb to a lower cruise altitude.

As we have learned more about the Cardinal my habits have changed. I now keep the throttle full forward and pull RPM to 2500, then lean to my desired power setting. The GAMI injectors allow me to run well lean of peak, setting the power level with fuel rather than air.

Once established in a cruise clime I'll lean to 68% power, either by adjusting throttle or mixture. That's about 10.2 Gallons Per Hour when rich of peak. If you are lean of peak you'll do better. A JPI engine monitoring system and/or fuel flow are extremely handy for this process.

68% power requires full throttle at around 8,000 feet and the climb rate will taper to around 350 FPM at 12,000 feet. I've had my RG up to 17,500, a little over the rated service ceiling of 17,100.

If you are prefer to cruise in the flight levels, skip the cruise climb and leave the throttle in after takeoff. An airspeed of 97 knots will have you headed up at 500 FPM or more, right through 8,000 feet. You'll still be climbing well at 10,000 feet, but you'll want to control oil and cylinder head temperatures with the cowl flaps and, on very hot days, either a slightly richer or leaner mixture. The IO-360 loves to run flat out, so don't worry about staying at full throttle.

Some Cardinal pilots fly a low power mode in cruise, with the prop back to 2,100 and full throttle. They report great efficiency numbers in this configuration, but the best advice may be to run the engine where it feels happiest.

The Cardinal really shines on a longer trip. The 60 gallons of fuel in the `76 will take you 5 hours with a healthy reserve, enough time to put 700 miles or better behind you at 8,000 feet, further up higher. And the cabin is large enough to make it a pleasant journey.

Most 172 pilots transitioning into the Cardinal have trouble calculating how far out to start down. I plan a 300 FPM descent, which can almost always be done while remaining under the yellow airspeed arc. Based on this, my rule of thumb is 3 minutes per thousand. So from 12,000 feet to a 2,000 foot pattern I'll need 30 minutes. At 150 knot descent rates that's 75 miles out.

5 miles from the airport I'll throttle slowly back to 130 knots, where the first notch of flaps can go out. This helps slow me to 100 knots at mid field downwind, a great time to throw out the gear. The gear can be lowered at 125 knots, but I'm buying the gear parts so I stick to 100 knots, just in case it matters.

With this added drag the rest of the pattern is standard Cessna, with the normal light elevator feel restored at the lower speed. In the winter you'll notice that having that slower flight with gear down has a significant effect on airflow through the heater, so you'll tend to keep those patterns tight below freezing.

Holding 70-75 knots down final works out well. The elevator will get even lighter as you cross the fence at 65 and and dropping for the flare. The Cardinal does not take kindly to being forced down and may respond with a bounce.

The normal 172 reaction to a bounce or balloon is all wrong for a Cardinal, and will just make the next bounce worse. Instead of pushing the nose over (which the large stabilator does very well) just hold still for a moment. You will find that the Cardinal sorts it all out on its own almost every time.

If you want to improve the odds, a touch of power will bring things firmly under control. Many people learn this lesson dramatically in their early Cardinal flying days, but after a few dozen landings you'll find that the `Cardinal Crow-Hop' just doesn't seem to happen ever again.

The Cardinal performs well in short and soft field operations. Although the smaller RG wheels may keep you off beaches or very soft strips, the standard farm strip is no problem. With the extra horsepower and powerful stabilizer to lift the nosewheel off the turf the Cardinal comes very close to 172 performance on short grass. For landing, I routinely fly the short field approach (at 62 knots) and land in under 800 feet, just to prove I still can.

Isn't there a dark side to this machine? What about parts availability, landing gear maintenance and why can we name several people who don't own one?

Here's the straight skinny. It took Cessna a while to really get the Cardinal put together right. In the first year, 1968, an early decision was made to build the plane with a 150 horse engine. As the planned replacement for the 172 that was great for marketing, but the airframe just didn't respond well to that level of power under heavier loads.

Rumor has it that the marketing department wrote the performance figures as well, or at least measured them with a very well tuned `68. A neighbor who has a `68 says its a perfect training airplane because it forces you to think about performance calculations on every takeoff.

The 180 HP O-360 engine installed in `69 helped a lot, but the airplane really didn't find its stride until the 177B model added a constant velocity prop in 1970. In 1975 the landing gear and brake fairings were redesigned, giving a little more speed. A 60 gallon tank fuel became available in 1973.

The intrument panel of early Cardinals was built around a `car like' design, with a glare shield that extends just past the radio stack and leaves room on the right side for a glove box. This was expanded to full width in 1976, a consideration if you dream of installing a fully tricked-out panel. Many pre-'76 birds have impressive radio stacks, but the wider panel has a bit more space and feels more modern.

In its final year, 1978, Cessna built the fixed gear Cardinal Classic. A full-option airplane with leather seats, cup holders and even a drawing table for the rear passengers, the Classic was the most expensive Cardinal made. A 28 volt electric system along with the cosmetics makes it the most sought after of the Fixed Gear Cardinals.

Back in 1971 the folding leg version started its own evolution. With the injected version of the IO-360 Lycoming bringing 200 horses to the party the 177RG was the fastest and most efficient aircraft in its class.

The nay sayers tend to bring up the Cardinal gear, although it is still the only Cessna retractable gear with no ADs. Cessna improved the gear in several stages between 1971 and 1975. Most early RG owners fly for years without difficulty but on occasion you hear of one that needed serious Cardinal expertise to get the system back under control. Owners report that a few simple preventive maintenance items make even the earliest gear system dependable and cost effective.

In 1976 the engineers settled on the simplest version of the gear system and from then until the end of the line in 1978 the gear is very well behaved. There are unique things to know about, but most Cessna RG mechanics will feel right at home.

Again the 1978 version sported double the voltage and electrical system capacity, with the side effect of a quicker gear retraction time. The `78 RG is probably the ideal stock Cardinal. An aftermarket turbocharger is the next step, giving easy capability into the flight levels and a reported 177 knot cruise at 18,000 feet, still on very low fuel flows.

History and stats aside, what are the real problems you might run in to? There are a few common things which might come up.

Many Cardinal owners carry a towel in case of flight through rain. This is a fixable problem, but some Cardinals still get a few drips in the rain.

Some Cardinals have interesting patches in the lower fuselage in front of the door hingess. These are the result of owners who forgot about what those big doors can do with a tail wind on the ramp. The doors can be a challenge to seal and the hinges tend to wear over time, although the hinges can be rebuilt.

Keeping the full-flying stabilator tight is reasonably easy and looseness is not terribly critical but it is an area worthy of occasional attention. There is a special trick to know if your Fixed Gear nosewheel starts to shimmy or clunk. FG Drivers learn to never let their mechanic fill the shimmy dampner without supervision, since overfilling can destroy this expensive part. The stabilator brackets can crack unless replaced with upgraded steel parts.

You'll also have to watch your mags, the venturi in your O-360, keep an eye out for corrosion and listen for bird nests in the tail during preflight, but these things are common to any airplane.

In the event of governer work, if you have the 'D engine with a single 'dual mag', make sure your mechanic replaces the metal spacer under the governer. Forgetting this gasket causes all the oil to depart the aircraft within a half hour, and that's never a good thing. The Cardinal shares this issue with Mooneys, Arrows and other aircraft, but we hate to loose a Cardinal to such a simple thing.

Luckily, like many airplanes priced low enough for a mortal to own, the Cardinal has an active group of owners that will help you keep in touch with the latest wisdom in Cardinal ownership. You will find them here on the Cardinal Flyers Online web page, as well as the CFO email digest.

Only from an owner could you learn which model Ford uses the same door handle that Cessna gets $60 for or be reminded to check for a 90 durometer rubber pad on your nose gear actuator arm. And luckily many Cardinal owners are pretty well connected.

Owners are also a good place to find the best bargain on parts (they are usually not hard to find), learn how to keep your Cardinal running well (on a budget), find a well cared for Cardinal for sale (usually to a good home only!) and identify the really crackerjack Cardinal shops and mechanics for those rare problems that require creative analysis.

For our family the Cardinal has more than fulfilled our dreams. It has enough panel to hold every toy a sane pilot would want and more, it is fast enough to cover some real ground, fun enough to just fly around the patch and stable enough to hand fly IFR for hours. Ours has given us no surprises, just solid and predictable pleasure for the 2000 hours we've flown it (so far).

And best of all, even as the kids are growing as only kids can, there is still enough room in both airplane and budget for a little family aviation.

If you're interested in hearing a story of what its like to purchase a Cardinal, check out one member's experience.
