

People Who Fly In Glass Houses

The Cirrus SR22 has been wowing the masses with its sleek looks, speed, and high-tech panel. Swell, but how's it handle a day in the clag?

Some of us fall in love with vintage aircraft and embrace the simplicity of old technology. The rest of us are infatuated with the latest-and-greatest aviation gadgets. I can honestly say that I am firmly engulfed in the digital abyss.

Once I found out Cirrus Design Corporation was offering Avidyne's FlightMax Entegra Primary Flight Display (PFD) as an option in their SR22, I could not resist the temptation to own one. While not as sophisticated as the cockpit of a Boeing 777, the PFD-equipped Cirrus SR22 is a giant leap above the standard cockpit found in most single and multi-engine production aircraft.

The Cirrus SR22 has, in my opinion, emerged as one of the finest instrument-capable airplanes available on the market. Keep in mind that Cirrus has only been manufacturing the SR22 for a little under three years. The Cirrus factory in Duluth, Minnesota now churns out approximately two aircraft per business day. For those instrument pilots that feel the need for speed, the SR22 and its composite construction won't disappoint you.

Fly It, Buy It

I was introduced to Cirrus by virtue of my background and experience in meteorology. About two years ago, the Cirrus Owners and Pilots Association (COPA) asked me to develop and present a weather-related ground school segment for their Cirrus Pilot Proficiency Program (CPPP) that was in its early stages of development.

As a result, I scoured my local area and found a Cirrus owner in need of an instrument rating. I traded instrument instruction for some flight time in his Cirrus in order to gain some experience with this unfamiliar aircraft. Beware, it doesn't take long to

fall deeply in love. Without much convincing, I was ready to throw away the yoke in my Turbo Arrow IV for a side stick in the SR22.

I had the pleasure in April of taking delivery of N777WX, a brand spankin' new 2003 Cirrus SR22. I loaded it down with all of the available gadgets Cirrus had to offer except for the Goodrich SkyWatch Traffic Advisory System. I'll talk about that decision a bit later.

The Airplane

If the instrument panel doesn't immediately grab your attention, one of the

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first things that you'll notice when you sit in the cockpit of a Cirrus is the lack of a yoke. Instead you'll see a side stick on both sides of the cockpit. Even if you're right-handed, it will take you about 13.4 seconds to adapt to a side stick. The side stick is highly intuitive, especially if you played a lot of video games as a teenager.

About hand flying, the electric trim system in my opinion has to be the worst feature in this aircraft. The hat switch positioned on top of the stick controls both elevator and aileron trim. With no manual control I find it nearly impossible to fine-tune the trim to relieve all of the control pressure necessary to fly straight and level. Other Cirrus owners tell me that I'll eventually get a feel for the light flick required to trim the airplane. I'm not holding my breath at the moment.

If not trimmed properly, altitude and heading deviations can occur quickly. When life is good, a little deviation is acceptable. It's understandable why many Cirrus drivers use the autopilot for 98 percent of their flight operations. It's not the normal operations that concern me. Throw in a complication that renders the autopilot suspect and you could easily fall into an unusual attitude if not trimmed properly while debugging the problem.

The SR22 has two flap settings beyond zero degrees. Adding a notch of flaps one nautical mile prior to the final approach fix is absolutely necessary especially on an ILS-coupled approach. If you try to add flaps while on the glideslope, the ballooning that occurs is disruptive and forces the autopilot to oscillate through the glideslope.

When adding a notch of flaps while in straight-and-level flight, you must bear down on the electric trim for about six seconds to counter the resultant ballooning effect to avoid a huge altitude excursion. And of course, if you add that first notch of flaps with the autopilot engaged, the autopilot has to work just as hard. The autopilot doesn't have trim anticipation, therefore it is not as quick to recover.

The Need For Speed

The climb capability of this airplane is outstanding. A 2000-fpm climb rate is not unusual. Getting out of those valley airports with rocks on both sides is not an issue with the SR22's 310-hp Teledyne Continental Motors (TCM) IO-550-N under the cowling. Consequently, the SR22 can handle even the worst climb gradient instrument flight has to offer.

The SR22 is more demanding than the average single-engine air-

plane primarily due to its speed. With indicated cruise airspeeds in the mid-150 knots (true airspeeds in the upper-170s) staying ahead of the airplane is critical. Given the slippery nature of the composite design, the airplane doesn't slow down quickly. As a result, you must pay close attention to airspeed before beginning a descent for an instrument approach. Knowing your power settings for each phase of the instrument approach is a must.

"Seven Whiskey Xray, say speed," is a request that I'm not used to hearing from ATC. This is normally followed by a request to "Maintain at or below 150 knots; you're overtaking a 737 on a five-mile final." Okay, maybe I'm exaggerating a wee bit about overtaking a 737 – I should have said a Dash-8. Nevertheless, I'm still getting used to slowing down for ATC purposes. I've learned to ask, "How's my spacing behind that Gulfstream?"

CAPS

I can't forget to mention the parachute. Standard equipment on every Cirrus airplane is a Cirrus Airframe Parachute System (CAPS) manufactured by Ballistic Recovery Systems (BRS). No spin certification was done. Instead, the FAA bought into the parachute concept as the only legal way to recover from a stall-spin scenario. This does not imply however, that the aircraft is unstable or unrecoverable; Cirrus test pilots have demonstrated that it recovers quite nicely.

In the event a pilot gets seriously disoriented while in the clouds, possibly aggravated by an instrument failure, CAPS is an option simply not available to drivers of other production aircraft. Unfortunately, this does not eliminate accidents that have happened to a few Cirrus pilots while in the clag. The pilot must recognize there is a problem in the first place and deploy the chute in an appropriate manner. CAPS is definitely not a panacea for the lack of proficiency or poor judgment.

If the pilot chooses to deploy CAPS, the impact of the aircraft under the parachute canopy with the



ground below is a bit violent but highly survivable. Don't expect Cirrus to pack you a new chute and fly away from the landing site a day or two later. The aircraft likely will suffer substantial damage. Of course, rules are made to be broken; the first successful deployment of the chute after a flight control system failure resulted in minor damage as the airplane landed in a field of sagebrush that ultimately cushioned the impact.

The Avionics

When I bought my all-electric SR22 it came standard with dual Garmin GNS 430s, Sandel's SN3308 EHSI, Meggitt/S-Tec's System Fifty Five X analog autopilot and Avidyne's FlightMax EX5000C multi-function display (MFD). These features alone make it an exciting IFR platform. In addition to this terrific panel, Cirrus had a few more optional gems to choose from. Besides the Goodrich WX-500 Stormscope, I added the newly certified FlightMax Entegra Primary Flight Display (PFD) that replaces the Sandel EHSI. Cirrus now makes the PFD standard equipment. Being all-electric, the aircraft sports dual batteries and dual alternators as standard equipment.

The solid-state air data and attitude/heading reference system (ADAHRS) PFD is not just a replacement for the Sandel EHSI; it replaces the remaining five instruments in the standard six-pack as well as the sec-

***Above:** The author and his SR22 after the down payment check cleared the bank.*

ond VOR head and the clock. Also with the PFD option, three backup instruments appear in the bolster panel right below the PFD (the bolster panel is the panel right in front of your knees). This includes an airspeed indicator, attitude indicator with a built-in inclinometer, and altimeter.

The PFD layout is well designed and it's obvious that Avidyne took the time to incorporate many of the features found in some of today's best glass cockpits. The PFD display is split into two primary windows: A moving map HSI with heading bug and RMI pointer in the bottom window and all of the air data instruments and artificial horizon in the top window. Airspeed and altitude are displayed as tapes with the vertical speed displayed as an analog arc display.

The top half of the display contains the huge artificial horizon and flying-W, airspeed, and altitude tapes, vertical speed indicator, and vertical and horizontal deviation indicators used for instrument approaches. Both the vertical speed and altitude have bugs to command the autopilot.

So where's the turn coordinator? Avidyne chose to split this into a pyramid-shaped slip-and-skid indicator



Above: Avidyne's FlightMax Entegra Primary Flight Display (PFD) replaces the standard instrument six-pack with a more intuitive instrument scan.

over top the attitude indicator in the top window and the miniature airplane is now just a curved bar display around the top of the HSI in the bottom window.

Avidyne has produced an exquisite and uncomplicated interface between the systems on the airplane and the pilot. For example, if the heading bug is displayed as a solid symbol, this indicates that the aircraft's heading is being controlled by the autopilot. Similarly, the altitude and vertical speed bugs are also solid when active in their respective autopilot modes.

Unlike the Garmin 430 that has a deep nested user interface, Avidyne chose to keep the button pushing and knob twisting on both the PFD and MFD down to a minimum. This represents a huge human-factors engineering feat given the sophisticated nature of the instrument.

PFD Partial Panel

The PFD not only represents a new look and feel, it also opens up a whole new set of concerns. The first hurdle to get over is adapting to altitude and

airspeed tapes instead of the usual circular analog gauges. As you would expect, the instrument scan is totally different than with a traditional six-pack panel. With the big flying-W and artificial horizon staring at you, it's relatively easy to maintain altitude and airspeed even without looking at the tapes. In fact, with enough concentration you can notice even the smallest deviations in attitude and make immediate and precise corrections.

Besides the big yellow sticky note that you would need to cover up the PFD display, partial panel with this aircraft is quite different. At least three possible conditions can occur: 1. You lose the air data sources; 2. You lose the heading and attitude reference sources; or 3. The PFD goes Tango/Uniform altogether. A red X is used to replace a failed instrument indicator. On the positive side, if a failure condition does occur, it's likely to be abrupt rather than gradual.

In any of these failure scenarios, the PFD reminds you to revert to the backup instruments in the bolster panel right between your knees. The bolster instruments give you an airspeed indicator, altimeter, and right in the center you have an artificial horizon with an inclinometer.

You won't find a backup turn coordinator on the panel. Instead, you have to manually calculate the appro-

priate bank angle based on current airspeed to get the approximate rate of turn. Or you can just wing it.

A Bit Buggy

Is the PFD rock-solid-state dependable? Initially for me, no. I've had it fail twice while in the air and continue to have start-up glitches while on the ground. Usually, it's inconvenient rather than unsafe. I've contacted Avidyne and understand that there's a fix available. As I write this I have not made the fix but will report back when I do. Until then, departing into a low overcast without the PFD would be both illegal and stupid. To solve my start-up problem I shut the unit down, let it restart, and cross my fingers. In all fairness, my PFD failures were likely due to a faulty magnetometer.

At the moment, there are no certified procedures to restart the PFD while in flight because the start-up procedure requires that the aircraft remain stationary for at least three minutes. However, given a reasonably calm day with the autopilot doing the flying, I can attest to the fact that the PFD will restart while in the air. After such an air restart, can you trust what the PFD is telling you?

In the event of a failure of the PFD's attitude reference in flight, the bolster instruments provide a good backup platform. Additionally, the autopilot seamlessly transitions to tracking the number one Garmin GNS 430 GPS course (as you probably were using anyway). In this configuration, a failure can go unnoticed due to the seamless nature of the transition.

In the event of a PFD failure, your only choice is a PAR approach (good luck finding an ATC facility qualified for them) or a GPS/RNAV approach. Personally, I'd opt for the GPS/RNAV approach. Moreover, the approach must be done without the benefit of an HSI. Cirrus did not include a backup VOR head in the panel. Instead, you must use the course deviation indicator (CDI) on the Garmin 430.

Engine Monitoring

If you're a freak about managing your

engine parameters down to a gnat's eyelash, then you will love the optional EMax engine monitoring system provided by Avidyne. With this system you can see just about every engine parameter imaginable displayed in text and graphical form on the large MFD. The software also includes a lean assist option if you're not a numbers kind of pilot. This feature allows you to get right to the best economy or best power settings during cruise flight.

Weather Options

It just wouldn't be right if the weather guy didn't have the weather toys that are offered. The SR22 has two options for the purposes of dealing with two adverse weather phenomena, namely, ice and thunderstorms.

As Cirrus declares in its ads, "Ice happens." A TKS weeping wing ice protection system is available for SR22s only. However, this system is not certified for flight into known icing conditions. Cirrus only went as far as protecting the wings, horizontal stabilizer and propeller. This leaves many surfaces still unprotected.

The TKS system is capable of extending the time necessary to remove yourself from icing conditions. The approximate one-hour supply is not meant for sustained flight in icing conditions nor was it intended to poke through a layer of ice-laden clouds to get on top. When the pump is on high, the TKS fluid will only last for 30 minutes. Except for timing, there is no way to know how much fluid is left in the tank. The TKS system is a great safety option as long as the pilot remembers that it is not meant to add utility to the aircraft.

The Goodrich WX-500 Stormscope is another nice addition to the instrument platform. Strikes are displayed in cell or strike mode on the Garmin 430, MFD and the Sandel (assuming the PFD is not installed). Pilots must remember that the Stormscope is used as a gross vectoring aid and not for thunderstorm penetration.

The aircraft is certified up to

17,000 feet. While this won't get you over any thunderstorms, it provides the utility to fly over most non-frontal system icing encounters as seen in the Great Lakes region. With few choices of approved portable oxygen systems and the requirement to strap the bottle in the co-pilot's seat, flying high is not convenient or attractive unless you're flying alone.

What's Missing?

Like any gadget freak, I have a laundry list of things that I'd like to see added or changed. Top on this list is a manual pitch trim wheel. Being able to fine-tune the trim would make the airplane more pleasurable to hand fly.

The next missing element is a glideslope indicator on the HSI display. Currently only a D-bar is shown. If an ILS frequency is being received, vertical guidance is only shown using the vertical deviation indicator found on the top half of the PFD.

I opted against the Goodrich SkyWatch Traffic Advisory System due to its steep price tag. I would have preferred a more economic Garmin GTX 330 Mode S transponder, but it's not offered by Cirrus at the moment. I fly mostly IFR on the East Coast where Mode S coverage is plentiful. Getting traffic advisories off the Mode S data link (TIS) would have been a good economic compromise.

A second VOR display head with glideslope capability would be nice to have as a backup in the event of a PFD failure. This gives you the option of doing an ILS approach especially if the GPS approach minimums are too high or GPS RAIM detects a potential GPS integrity problem. Consequently, the PFD failure scenario forces you to avoid widespread IFR conditions that are forecast to be below GPS minimums at your destination.

One of the limitations that got my attention is that back course approaches are not approved with the current software version of the PFD-equipped SR22. Avidyne is working hard to change this limitation and has recently gotten FAA approval to allow back course localizer approaches.

The new software version will be made available in the near future.

Another serious deficit, in my opinion, is the lack of an aural chime or altitude alert when you reach or approach the altitude set in the PFD. When not equipped with a PFD, the SR22 comes standard with an altitude selector/alerter that does provide an aural warning.

Finally, I'd like to see an ADF added. I'm just kidding of course. On the other hand, our European friends would love to see an ADF receiver and DME added to the Cirrus since GPS approaches are not quite as commonplace as they are here in the U.S.

The Cirrus Twin

Cirrus has a twin aircraft called the SR20. No, I'm not talking about an airplane with multiple engines. Also a single-engine airplane, the airframe on the SR20 is virtually identical to the SR22 airframe. From a distance they're hard to distinguish from one another. Avionics and equipment differ slightly, but there are many more things the same than are different. The real difference exists under the hood. At 200 horses the SR20 still outperforms most other singles in its class.

Shock And Awe

Something that I enjoy, but haven't quite gotten used to, is the shock-and-awe factor. The SR22 can easily draw a crowd as you taxi up to the FBO. It's inevitable that someone has something good to say about the airplane or at least is curious and feels the need to witness it up close.

If that isn't enough, it's fun to see their jaws hit the tarmac when you show them the instrument panel. Hey, when you're in love, you like to show off.

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