March 2012
Volume XLII
Number 3

The consumer resource for pilots and aircraft owners

The Aviation Consumer®

Gippsland GA8 Airvan

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The Aviation Consumer

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REPRINTS: *Aviation Consumer* can provide you or your organization with reprints. Minimum order is 1000 copies. Contact Jennifer Jimolka, 203-857-3144

AVIATION CONSUMER (ISSN #0147-9911) is published monthly by Belvoir Aviation Group LLC, an affiliate of Belvoir Media Group, 800 Connecticut Avenue, Norwalk, CT 06854-1631. Robert Englander, Chairman and CEO; Timothy H. Cole, Executive Vice President, Editorial Director; Philip L. Penny, Chief Operating Officer; Greg King, Executive Vice President, Marketing Director; Ron Goldberg, Chief Financial Officer; Tom Canfield, Vice President, Circulation.

Periodicals postage paid at Norwalk, CT, and at additional mailing offices. Revenue Canada GST Account #128044658. Subscriptions: $84 annually; single copies, $10.00. Bulk rate subscriptions for organizations are available.

Postmaster: Send address corrections to AVIATION CONSUMER, P.O. Box 8535, Big Sandy, TX 75755-8535. In Canada, P.O. Box 39 Norwich, ON NOJ1PO, Canada. Publishing Agreement Number #40016479

The Declining State of Maintenance

Although I didn't plan it that way, this issue deals with a couple of critical aircraft maintenance considerations: corrosion prevention efforts and engine maintenance. The ugly reality here is that owners, because they are flying less, are also doing less preventive maintenance, if they're doing any at all. It has now become normal to see an airplane in annual with 20 or fewer hours on the clock during the previous year. You can blame this on high fuel prices if you want, but I think there's more to it than that. I think just about anyone who can support the airplane's fixed costs can also afford another 100 gallons of gas a year. But I digress.

I was talking to a mechanic the other day about an annual he was working on. The airplane needed some significant work, including a couple of overhauled mags. They hadn't been touched in 1200 hours, despite the standard service bulletins requiring 500-hour inspections. He also told me that when he calls owners to discuss such things, he's hearing more pleas to just overlook the problem or defer it to next time. I suspect a lot more IAs are being asked to sign off unairworthy airplanes and that it's getting more difficult for them to resist the pressure to do just that.

On the engine front, when I was doing the interviews for the bulletproof engines piece on page 11, nearly all of the shops told me they're seeing engines come in for overhaul that just haven't been maintained even to the minimum condition—like no oil change for two years on an engine that hadn't been flown 40 hours during that period. Dave Allen from Poplar Grove Airmotive says he thinks at least some Continental cylinder problems are due to owners and/or mechanics not tending to the unmetered fuel pressure settings on Continental fuel systems. This is a critical procedure that's not that difficult to do, but it's either being intentionally overlooked or just forgotten entirely. If you, as an owner, skip enough maintenance procedures, they'll recede into the background and before you know it, you'll have a scrap heap on your hands.

None of this is to say that deferred maintenance is a bad thing. It isn't at all. You simply can't afford nor do you need to constantly fix every little thing that's wrong with the airplane. If a CHT probe goes south or an oleo strut gets a little weepy, you don't have so drop everything and fix it before the next flight. Same thing with the 500-hour mag check. If you sail past it by 50 hours with no indications of malfunction, hair isn't going to erupt from your palms. But there's a reasonable limit in there somewhere and I think if you fly another 500 hours and five years without checking the things, you're missing the point.

My suggestion is to budget money for preventive but optional maintenance such as the corrosion treatments covered in this issue and don't backslide on it. Even a modest airplane is a substantial investment that simply craters if you don't take the minimal steps to keep it from corroding or accumulating so many deferred items that it's functionally unairworthy.

Digital AvCon

We've heard from a number of readers requesting a digitial issue of *Aviation Consumer* and we've got plans in the works to make this happen. But before pushing the button, we would like to hear from more readers with ideas on what exactly you'd prefer. Some years ago, as a publishing company, we jumped the gun on this by offering electronically deliverable PDF versions of our magazines. But that was pre-iPad and the effort failed to gain much traction.

So, if you're interested in a digital edition, how about going to this link—www.snipurl.com/224ql8l—and let us know what you think. We'll take it from there. —*Paul Bertorelli*

Fuel Totalizer Accuracy

In spring, I had a new Garmin GTN750 installed in my 1983 Mooney 201 and was amazed by the unit's performance. The only thing missing was fuel management capability and as a result, I had the fuel flow option added to the existing EDM-700 and wired into the GTN.

Since this was my first exposure to fuel flow monitoring, I didn't know what to expect in terms of reliability and accuracy. And what I experienced in the field blew me away. I was expecting a reporting accuracy rate of perhaps 96 percent, but was pleasantly surprised to find the accuracy greater than 99 percent. At each fill-up, I compare the fuel loaded onboard with what the unit stated as actually having been used and the numbers are always within a few ounces.

While I found the article very informative, I was surprised that *Aviation Consumer* didn't test the units for accuracy and publish the results, as that's what these units are all about.

Michael Gordon
Via e-mail

You got lucky. Most fuel totalizers installations require trial-and-error adjustments in the so-called K-factor each instrument has. K-factor accounts to variations in how the fuel transducer measures flow and it can vary widely from installation to installation, thus it's neither practical nor possible to compare accuracy.

Theoretically, if you're obsessive about adjusting K-factor, you should get near perfect accuracy with any fuel totalizer.

I Like It

As a relatively new reader, I wanted to give you my thoughts on your publication. I have been a subscriber to *KITPLANES* for years and my primary interest is in single-engine, fixed-wing and homebuilt aviation. I always re-up my subscription at Oshkosh, and was given some free back issues of *Aviation Consumer.*

I read through them while waiting for Theater in the Woods that night, and again the next day and was quite impressed—so I subscribed for the year. Contrary to my fears that the magazine would be focused only on high-end (unaffordable to me) certified aviation, you have a very good mix of articles spanning the twin-engine Cessnas all the way down to $20 pilot gear like the recent windshield wash/coating article.

I also really appreciated the articles on Rotax overhauls and the new Garmin handheld. I built and fly my own Avid Mk 4 with a Rotax 912 ULS and a Garmin 396 inset with an AirGizmos holder in my panel. So this type of article is right up my alley.

I also look forward to the classic aircraft reviews. If you haven't covered them recently, you might also consider comparison of the Taylorcrafts with Luscombes against similar modern homebuilts.

After spending nine years off and on building, I've often wondered if I wouldn't have been better off financially buying a classic plane instead of building my own for $35,000 to $40,000. If it doesn't already exist, a database of annual costs across certified and homebuilt airplane types would be very useful. Again, thanks for putting out a quality publication!

Kris Murphy
Mt. Horeb, Wisconsin

ADS-B Query

I just caught up with your November 2011 issue. I never see the Bendix King KT 73 mentioned in ADS coverage, although this transponder is advertised as being easily upgraded to ADS-B ops, like the Garmin.

It seems almost rebellious these days to be buying Bendix/King gear, but I have been very pleased with my KT 73, which I have owned since it became available. I assume there are more than a few of these out there, although I rarely see them mentioned. Price point is about the same as Garmin, I believe.

Rodman Paul
via e-mail

The KT73 dates back to around the year 2000 timeframe, before the ADS-B infrastructure was in place. Still, operating software 1/02 or higher enables ADS-B output. But Bendix/King warns that this isn't compatible with current ADS-B output specifications without further software updating. It will work in Australia, we're told. We've put a bug in the ears of Bendix/King engineering on the status of this and will report back when we learn more.

Cirrus Safety

Reference the article on Cirrus safety in the January 2012 issue. Twenty-seven deaths in 13 fatal accidents involving Cirrus aircraft in six months since June 29, 2011, seems to support your point about CAPS training, but also brings into question the training of Cirrus pilots in general.

Is there a false sense of security associated with this aircraft that leads inexperienced and/or unqualified pilots to take greater flying risks?

Rae Willis
Via e-mail

This is, of course, the theory of risk homeostasis and is definitely qualifies as a chicken-egg consideration.

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Gippsland GA8TC: Flies Sweet, Hauls a Lot

A turbo model is more for high density altitude than speed, but the airplane excels in the combined cargo/freight role.

by Paul Bertorelli

The heavy-hauler aircraft niche is such a sub-specialty that not many dedicated models exist, with Cessna's Caravan being the most obvious success story. Piper's Saratoga and the 200 series from Cessna qualify, but none are devoted purely to the lots-of-people or the lots-of-boxes role. That certainly can't be said of the Gippsland Aeronautics GA-8 Airvan, an aircraft that's unabashedly devoted to hauling stuff. A lot of stuff.

We were first introduced to the Airvan 10 years ago, just after it appeared as what we might now call the leading edge of the world or international airplane. Built in Australia, the model hasn't been a huge seller, but with about 170-plus flying, it's gained a foothold.

Two years ago, Gippsland (pronounced with a hard G) got a huge cash infusion from the Indian industrial conglomerate Mahindra and it has put the capital to work developing two new models, the GA8TC we flew for this report and a soon-to-fly turbine version called the GA10, which will use the Allison/Rolls turboshaft found in the conversions we reported on in the February 2012 issue of *Aviation Consumer*.

AIRCRAFT FLIGHT TRIAL

This airplane is best thought of as resting between compromised haulers like the Cessna 206 and perhaps the Cherokee 6/Saratoga and the muscular Cessna 208 Caravan. It's got a larger cabin than the former, but it's cheaper to buy new and operate than the Caravan is.

But that's not to say cheap, exactly. The normally aspirated GA8 sells for about $699,000, while the GA8TC we flew would sell for about $800,000, equipped with the optional cargo pod.

MODEL HISTORY

George Morgan, a Gippsland co-founder, and U.S. rep Randy Juen dropped by our home airport with the new GA8TC. Gippsland is relatively new to the North American market, but it's by no means a new company. It was formed in the 1970s as a maintenance and mod house.

Because Australia—and Australasia, for that matter—has more outback than urban area and more unimproved airstrips than runways, Gippsland saw space for piston-powered hauler with good STOL capability.

Using the GA200C as the certification starting point, Gippsland began work on the GA8 in 1993, obtaining Australian approval in 2000, followed by U.S. and Canadian approvals. Morgan and his partner Peter Furlong had in mind an airplane that would haul more and be more durable than the Cessna 206, without resorting to a turboprop engine which introduced size complications, not to mention a

CHECKLIST

- ⊕ The airframe is all but uncompromised purely for the cargo/pax combination.
- ⊕ Access via sliding door is superb. Crew has individual doors.
- ⊕ The Airvan is among the best-handling airplanes we've ever flown.
- ~ At $800,000, buyers will need plenty of revenue potential to make it work.

price they thought few could afford.

The result is a boxy airframe that looks a little like a Sanforized Caravan. In fact, at a distance, the airplane could be mistaken for a Caravan, even though the viewer will sense that the size isn't quite right. The box, it turns out, is the ideal shape for, well, more boxes inside, six passenger seats or combinations of freight and passengers through a highly flexible loading strategy.

While the airplane is hardly as large as a Caravan, it's not exactly small, either. The constant-chord, strutted wing spans 40 feet, 8 inches and the tail span is 13 feet, 7 inches, with an enormous stab and elevator. (More on that later.)

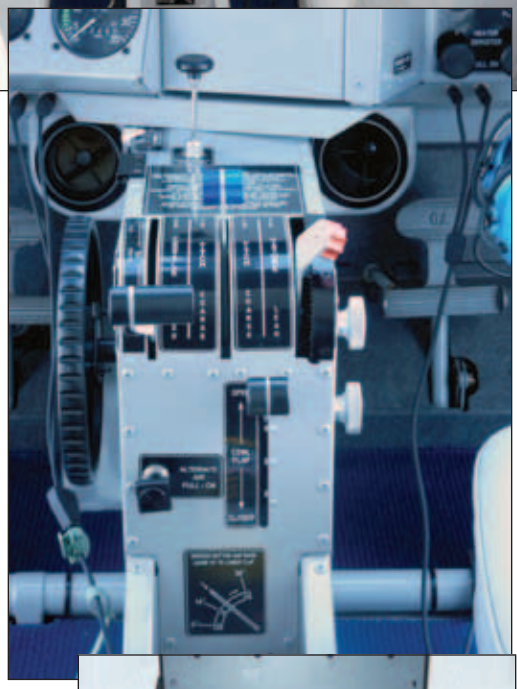
Construction is conventional riveted aluminum throughout, with judicious use of carbon, Kevlar and glass in the cowling sections. The cowl itself is a four-piece affair, with two removable side panels, a center top panel and a lower, single-piece cowling. The carbon fiber is expensive, but has better fatigue life than aluminum and proved more heat resistant in burn tests. We also noted use of carbon fiber in the engine baffles, which ought to reduce cracking.

Speaking of the engine, the GA8TC uses the Lycoming TIO-540-AH1A, a 320-HP variant that's essentially the same engine found in the Turbo Saratoga. It swings a three-blade Hartzell prop specifically developed to work with the GA8TC's lower-drag cowl.

Gippsland spec'd dual oil coolers for its engine installation because the airplane is intended to operate in hot desert climates where overheating would be a problem. For maintenance ease, it's also got an Airwolf remote filter mount, with the can positioned vertically to reduce the mess.

NICE TOUCHES

Although by no means a luxurious airplane, the GA8 is loaded with basic structural features and pilot-friendly perks that impressed us. It's built to FAR 23 Amendment 53, so it has all the latest crashworthiness additions, including a beefed-up firewall structure to protect the cabin and energy-absorbing seats for the crew and passengers. To protect cabin integrity, a pair of beefy vertical box



The Airvan has a big aircraft cockpit, including giant control wheels on floor-mounted columns and a massive center console, right, for the power controls. We could do without the electricals on the overhead. Although well labeled, they're too close in to read, so switchwork requires some neck craning.

structures form the front portion of the cabin and tie into the spar structure for the wing.

The cabin itself is large enough for six seats with an aisle. We would call it comfortable if not commodious when all the seats are installed. The main door sill is 33 inches above the ground, so a small removable step is a nice a touch. So is a large, openable-in-flight sliding door that provides a 42-inch opening—plenty of room for cargo of all sizes, including 55-gallon drums and motorcycles.

Gippsland has obviously paid attention to customer demands for commercial common sense since this is, after all, a working airplane. Thanks to quick-connect sockets on the floor, it can be converted from passenger to freight operation in about 10 minutes, according to George Morgan. There are also load sockets on the ceiling to accommodate cargo netting rated for 18G. Morgan told us a pilot in Australia crashed an Airvan on a foggy GPS approach and lived to tell about. "It pitched him straight into the ground with a full load of freight. The airplane stopped in about six feet. He survived and the cargo net held," Morgan said.

The fuel is relatively well protected

WHO ARE THESE GUYS?

To understand how GippsAero evolved, think of your local airport maintenance shop—a sophisticated one—-slowly growing over the years, adding services and capabilities until one day, it's actually building airplanes. The company was formed by Peter Furlong during the 1970s as an aircraft maintenance and modification house. George Morgan joined the company in 1984, at which point it adopted its current name. GippsAero is headquartered at Latrobe Regional Airport east of Melbourne in southeast Australia. Today, it employs about 140 people.

Morgan is an aircraft maintenance engineer; what he describes is somewhere between what we know as an A&P and an IA. Furlong and Morgan developed a lively business repairing and modifying the ag aircraft that are widely used in Australia and soon realized there was a market for a home-grown Australian ag plane.

That work led to the company's first cert project, the GA200 Fatman, a low-wing ag plane with high weight-carrying capacity. In 1993, it upped the Fatman's horsepower to 300, to produce the GA200C. About 45 have been built.

Because Australia has a large land mass with few roads but a lot of unimproved air strips, it's the ideal market for a heavy-hauling utility airplane, hence the GA8 Airvan. Morgan and Furlong figured that was a niche for an airplane that did what Beavers, 206s and Caravans don't do, and their hunch proved correct. The Airvan appeared in 2000 and has generated moderate sales on the world market.

GippsAero began as a self-capitalized company, but in 2009, the Indian industrial conglomerate Mahindra bought a $38 million controlling share in GippsAero. The original owners retain a 30 percent stake, according to Morgan.

in two wet-wing cells for a total capacity of 87 gallons. The fuel is routed into a header tank under the co-pilot's seat. While we don't like the idea of fuel in the cabin, the tank is also a wet cell and double-skinned to protect it against crash damage. Valving, well, there is none—the fuel is on or off via a firewall shutoff. Two slope valves keep the fuel from running downhill if the airplane is parked on a sloped ramp.

LOADING, CABIN

When it first appeared, the GA8 had a gross weight of 4000 pounds, but that's just been increased to 4200 for both the normally aspirated and turbocharged models. The airplane we flew had three empty weight figures, depending on configuration. With an empty cabin—not seats or freight hardware—its useful load is 1879 pounds. With the freight setup, it's a bit lighter and can carry 1840 pounds, including fuel. With all the seats installed, useful drops to 1730 pounds. That means it can carry eight people, if they're not much over the standard FAA-issue 170 pounds and you don't have far to fly. More practically, this is a six- or seven-person airplane for short legs or five or six for longer trips. With four people, you can fill the tanks and bring steamer trunks for everyone.

CG is exceptionally forgiving because it's designed to be. "By configuring the wing relative to the balance point of the airplane, we organized it so when the airplane is empty, it's very nose heavy," Morgan told us. "We did that on purpose. Because bush operators aren't going to be doing weight and balance."

As a result, says Morgan, if a pilot loads the airplane and does a chin up on the horizontal stab without the tail coming down, the airplane is within the aft CG. However, CG is biased forward, so with two people aboard, the airplane is out of the forward limit. But with its huge elevator and aggressive trim, Morgan says it's easily flyable. (We agree—we tried it, although with some stuff in the tail baggage area.)

The CG range is so generous, in fact, that the baggage space extends all the way into the tailcone, with an aft capacity of 300 pounds. It can be loaded that way with passengers in the cabin seats. (When Morgan and Juen arrived at Venice, the cabin was packed full of gear, including two bicycles, extra seats and a passenger.)

The rear baggage area is contained by a fabric cover and a net, although getting at it may require navigating or removing the rearmost seats. At 12 pounds, they're easy to handle.

AC TV

For a video flight report on the GA8 Airvan, scan the QR tag at right with a mobile app or log onto www.avweb.com and scroll down to the Airvan video. The direct URL for the video is www.snipurl.com/224r6wg

With its high stance, egressing the airplane looks awkward, but isn't. Passengers enter the main sliding door, using the removable step. Crew members have their own doors—seaplane operators will love that—with a grab handle and a small step. We didn't have to be instructed on how to get into the airplane, which isn't true of all the models we encounter.

The control column has a giant retro yoke on a column that extends all the way to the floor, but it's no more difficult to scoot by than the typical center stick. Another nice touch we noted was that the pilot doors open a full 180 degrees and are held in the open position by a lock activated by the door latch, thus you don't have to worry about wind damage if the aircraft is unattended.

The pilot seats are adjustable fore and aft and with large bubble windows in the doors so visibility out and down is excellent. Although the GA8 isn't a huge airplane, its cockpit has a big airplane feel. The engine, trim and cowl flap controls are mounted on a large center pedestal and the manual, Johnson-bar flaps are on the floor on the pilot side.

We do have one complaint about the cockpit layout: Master, avionics and lighting switches are on the overhead, along with some circuit breakers. In a small cockpit, overhead panels are a terrible idea, in our view. They're too close to read the switch labels and you have to manipulate the toggles more or less by memory. Morgan concedes the point and says as avionics become more compact, the switches might migrate to the main panel. We would much prefer this.

The aircraft we flew was semi-glass, with a combination of an Aspen Evolution and steam gauges. It also had a Garmin GTN650/750 combination, but Morgan told us Gippsland can install virtually any avionics that a customer might want, with the exception of large-panel glass like the G1000, which probably won't fit and which bush operators need like a second head.

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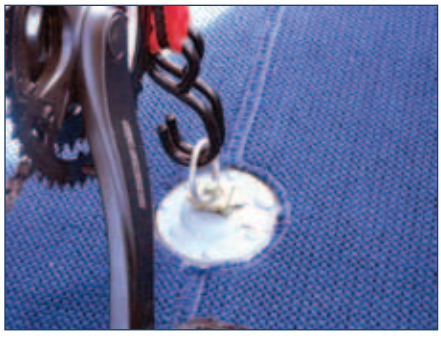


The GA8's large sliding door, demonstrated by Randy Juen, right, provides a 42-inch opening. That's plenty of room for both seats and cargo, center photo. Load sockets on the floor do double duty as cargo hooks and seat attach point, bottom photo.

FLYING IT

There's nothing difficult about operating the GA8. It's one of the few airplanes we've flown that we would feel perfectly comfortable jumping into without even a checkout. Engine start is just like a Cherokee Six or Saratoga, and the cockpit layout has few surprises.

Taxiing is a bit of a trick, however. On the ground, with the aircraft stationary, the rudder pedals don't budge. It's like they're set in concrete. Once rolling, you can turn with the pedals—stiffly—but applying brake only serves to sideload the nosegear. Taxiing is precise enough, but remembering to use no brakes takes some accommodation. The nosegear strut itself, by the way, has an oil-damped steel spring, not an oleo strut, so it should be less maintenance hungry.

We flew the airplane with five people aboard and some baggage in the rear, then once again with only two people on a short grass strip. Frankly, other than some float on landing, we didn't feel a lot of performance difference. With 320 sea-level horsepower, the airplane doesn't quite bolt off the runway, but it gathers itself up and accelerates smartly to rotation.

We would describe the control forces as, well, close to perfect. Given the size and weight of the airplane, we would expect a little heaviness but not so. Pitch is pleasantly light—fingertip, really—and roll is just heavy enough to keep the airplane planted when rolling into and out of headings. The rudder remains somewhat heavy in the air, but it's effective. It's also somewhat unusual, being what Morgan called a deep-chord, low-set design; it's broad but doesn't extend to the top of the vertical fin. Like the elevator, it's mass balanced for added flutter protection and because of the hard linkage to the pedals, the rudder mass balance obviates the need for a shimmy damper on the nose-

continued on page 32

Corrosion Treatments: Well Worth The Trouble

While there is evidence CorrosionX provides the best protection, ACF-50 also works well. Get it applied by a pro, however, or you'll be cleaning it up for months.

by Jeff Van West

Corrosion is like aging; it does its damage slowly and is easy to overlook—until major systems begin to fail. Unlike aging, we know how to stop corrosion in aircraft. It's cheap insurance against a slow destruction of your airframe.

The downside is a cleaning up your airplane for at least a few weeks, and possibly several months. You also might discover corrosion damage that would have passed unnoticed for years and now appears as loose rivets and joints. We're not sure revealing lurking damage is a downside, however. We'd rather stop the spread and know the full extent of any degradation here and now.

This is where owners of fiberglass aircraft get to turn to the next article with a smug expression on their faces. The rest of us who fly aluminum birds should read on.

AVIATION FILM STARS

Once upon at time, corrosion protection came through a barrier coating sprayed inside the aircraft. They're still used in large-aircraft operations, but they've been long supplanted in GA by fluid thin-film coatings (FTFCs). FTFCs aren't really barriers. They're sacrificial dielectric compounds that inhibit electron transfer at the molecular level. They don't so much block moisture (although they do displace it when applied) as make it unable to promote corrosion.

The two most commonly used FTFCs are ACF-50 from Lear Chemical Research, of Ontario, Canada, who pioneered the product, and CorrosionX by Corrosion Technologies of Garland, Texas. Both products have their following, but CorrosionX seems to have the larger share of the market in the U.S.

FTFCs are fogged in using high-pressure through slim application wands, which means they can reach nearly every crevice of the aircraft. The compounds are designed to seep into lapped metal surfaces and even around the shanks of rivets. J.D. Hill, V.P. of Marketing for Corrosion Technologies, does a demonstration where he sprays CorrosionX with a dye added on the one side of aluminum sheet riveted together. He'll count to 60, and the show the dye in a perfect circle around the rivet head on the other side of the aluminum. FTFCs actively seek the micro-spaces between metal.

But as the demo shows, they also weep back out. For a month or so after treatment, it's normal to see the stuff weeping out of joints and around rivets. It wipes off and won't harm your paint, rivet integrity or other structure. On the plus side, FTFCs often smoothen cable and control freedom as they act as a lubricant. There are even reports of intermittent microswitches becoming fully operational as corrosion loosens and falls off terminals.

Just to be clear: none of these products will repair corrosion. Lost metal is permanently gone. They will, however, get between the corrosion and the bare metal beneath

CHECKLIST

- ⊕ Modern FTFC products work and add negligible weight to the aircraft.
- ⊕ At about $300 for up to two years' protection, the treatment is a good value.
- ⊖ It weeps out from joints and rivets, making a mess you'll be wiping up for weeks or longer.

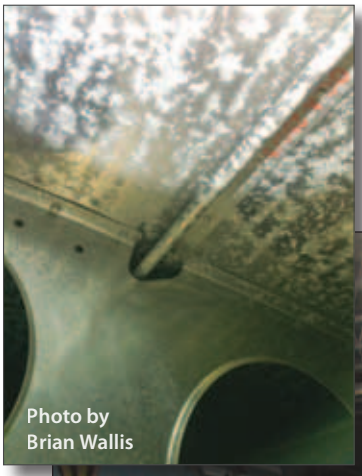


Photo by Brian Wallis

Corrosion treatment with FTFCs means fogging the stuff into every crevice, so it's best done when the aircraft is open for annual. That's when your A&P is likely to find the telltale white powder of corrosion.

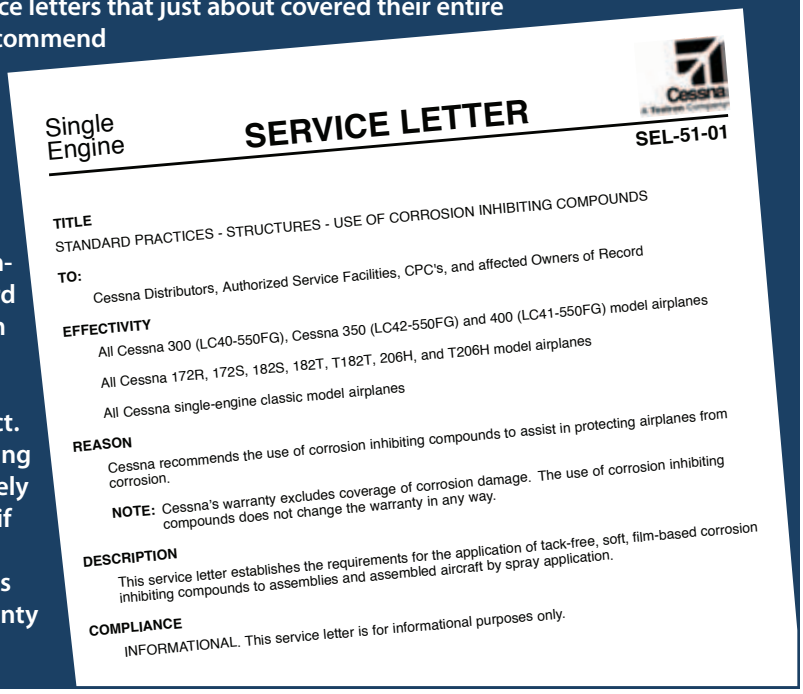
CESSNA TAKES A STAND ON CORROSION

At the end of January, Cessna published four service letters that just about covered their entire prop-driven fleet, past and present. The letters recommend corrosion treatments for all their aircraft, with the recommended material being Cor-Ban 23. The letter for single-engine pistons can be found at http://snipurl.com/2249hbd.

Cor-Ban is a Cessna product and is not an FTFC. Instead, it's a thicker product that coats metal to block corrosion. This kind of material has disadvantages in weight and reapplication. We've also heard of dissatisfaction with Cor-Ban's performance from an operator of many Cessna aircraft.

The service letter is only a recommendation, so you don't have to comply using the Cessna product. Corrosion Technologies also told us they are working with Cessna to distribute their product, and it's likely they will be included in future recommendations, if Cessna's blessing matters to you.

One critical takeaway from the letter, however, is that corrosion is not covered under Cessna's warranty no matter what corrosion treatment you choose.



Single Engine

SERVICE LETTER

SEL-51-01

TITLE
STANDARD PRACTICES - STRUCTURES - USE OF CORROSION INHIBITING COMPOUNDS

TO:
Cessna Distributors, Authorized Service Facilities, CPC's, and affected Owners of Record

EFFECTIVITY
All Cessna 300 (LC40-550FG), Cessna 350 (LC42-550FG) and 400 (LC41-550FG) model airplanes

All Cessna 172R, 172S, 182S, 182T, T182T, 206H, and T206H model airplanes

All Cessna single-engine classic model airplanes

REASON
Cessna recommends the use of corrosion inhibiting compounds to assist in protecting airplanes from corrosion.

NOTE: Cessna's warranty excludes coverage of corrosion damage. The use of corrosion inhibiting compounds does not change the warranty in any way.

DESCRIPTION
This service letter establishes the requirements for the application of tack-free, soft, film-based corrosion inhibiting compounds to assemblies and assembled aircraft by spray application.

COMPLIANCE
INFORMATIONAL. This service letter is for informational purposes only.

it often displacing the corrosion so it falls out and off. This can have structural implications (see sidebar on page 10).

When we last looked at FTFC products in 1997, there was some question about methylene chloride and the role of organic fatty acids in promoting fungal growth.

We've talked to both companies and reviewed their materials safety data sheets now. The methylene chloride is long gone and both qualify is non-toxic. That's not to say you should drink the stuff, but it's safe to wipe off excess with a rag held in your bare hand.

Appliers of both products told us they see about the same amount of this in treated and untreated airplanes (Mushrooms in your fuselage. Who knew?).

CHOOSE SKILL, NOT PRODUCT

CorrosionX is the only commercially available FTFC that meets the new Milspec PRF-81309F, which replaced MIL C-81309E covering these types of products. Military use is about 30 percent of Corrosion Technologies' business, so the company reformulated to meet the new standard. When they did this, they incorporated several small changes they had waiting in the lab, and the newer CorrosionX performs better on all lab tests than the earlier compound.

J.D. Hill of Corrosion Technologies says this is a reason to seek out CorrosionX. "What you're buying for yourself is peace of mind and safety margin. Where the price is the same, why wouldn't you buy the extra margin of safety?"

Mark Pearson, General Manager for Lear Chemical, counters that ACF-50 is a tried and true formulation with 20 years of success in the field. He also points out that customers sometimes buy ACF-50 for the smell. (We've heard it described ranging from a sweet, floral smell to brass polish.) These folks told Pearson they detected an unpleasant lingering smell from "Brand X."

The Collins Foundation was replacing sheet metal with some frequency. That need has all but vanished.

We think all this may be a distinction without a difference in practice. Both CorrosionX and ACF-50 recommend the same reapplication every two years and both show good results in stopping corrosion. Never in our discussions with shops did we hear comments about how owners should stay away from "the other brand." A shop's choice to use one or the other seemed to rest much more on what equipment the shop had available—the application gear is different for the two products—and which sales rep the shop owner happen to talk to first.

What's far more important for your long-term satisfaction than choosing Brand X or Y is getting a shop that has experience in applying FTFCs. "It takes some finesse," says John Atterholt, director of maintenance for Arizona Air-Craftsman. They've been doing ACF-50 treatments for over 14 years. "The first few we did, we laid it in way too heavy. The idea is to get a really good fog without saturating or pooling." While overapplying the product won't actually hurt anything, it will make the weeping out much worse and go on for much longer.

We've heard some owners complain that they were still wiping up their airplanes over a year later. After

SMOKING RIVETS, LOOSE LAPS

Troll the internet for discussions on CorrosionX and ACF-50 and you'll see claims it causes loose rivet—so-called "smoking rivets" due to a stain that trails downwind from the rivet along the paint. Our discussions with shops and manufacturers revealed you may see smoking and loose rivets after treatment, but not for the reason the internet trolls claim.

FTFCs are fogged into the airframe in a uniform mist, settling on all the interior surfaces, and then flowing into small spaces, between skins and ribs, between lap joints and even along rivet shanks.

The excess material will slowly flow out rivet holes, leading to noticeable staining streaming back from rivets and lap joints in the wing and the fuselage. The staining is easily removed with a cloth or paper towel. (Corrosion Technologies sells a washing additive specifically designed to clean up staining.) This is normal, so expect it.

However, these materials also get between corrosion and good metal. If that corrosion is around a rivet, it may free the corrosion and loosen a rivet previously held tight by corrosion. If the "smoking" persists, it's a good idea to have an experienced I/A check for looseness or excessive corrosion. They can sometimes be rebucked in place or, if loose enough, replaced entirely.

Discovering unknown corrosion this way is as frustrating as it is expensive. But we think J.D. Hill of Corrosion Technologies countered this well: "It's a pain in the butt to deal with the loose rivet. But if your airplane is being held together with corroded rivets, it's not structurally sound."

talking to application shops, we're convinced this is due to poor application rather than something intrinsic in using FTFCs. Lear Chemical's original equipment would pump about a gallon of AFC-50 into a Cessna 172. Current nozzles and techniques treat the entire plane with a quart to a quart and a half.

Both ACF-50 and CorrosionX are harmless to avionics and plastics. In fact, they can be a benefit for exposed electric terminals. But Mike Holoman, whose does CorrosionX treatments for Aviation Tech Services in Edgewater, Florida, points out there are a couple spots to be careful about. Brakes are an obvious friction surface you don't want a lubricant on, but autopilot friction points are easy for a novice sprayer to overlook.

Holoman runs a mobile treatment service that sprays 45-60 aircraft a year at local FBOs and airports. His recommendation (echoed by several others) was to have the treatment done as the very last step of your annual inspection. "That is when you'll get the best job. I'll go though every orifice. You don't want to pay me to open everything up and then close it back up again." Atterholt said the same, but added that because of the weeping out, "Just don't do it before a paint job."

CONTACTS

Corrosion Technologies
800-638-7361
www.corrosionx.com

Lear Chemical Research
800-256-2548
www.learchem.com

HOW MUCH, HOW OFTEN?

If you talk to aircraft dealers and shops, you'll hear that even aircraft in the bone-dry Southwest can turn up with corrosion enough to kill a sale or create a nightmare annual for an owner who didn't see it coming. Aircraft that live near the coasts like people do, or even carry their owners to such climes regularly, are seriously at risk.

Expect a corrosion treatment for an average piston-single to run $250-350. (Our U.K. contacts quoted £225, which is about $350 as of this writing.) Turboprop singles or light twins can often be had for the same price. Expect to pay around $750 for a mid-size King Air.

The treatment is not permanent. The thin of FTFCs means they spread out to about 3/10,000 of an inch thick. That coating dissipates over time until it's essentially gone. Applications are generally considered good for two years, but application shops tell us every year in harsh, salt-air climates or for high-exposure operations (such as seaplanes) every year is a better choice. Atterholt says his Arizona-based aircraft regularly go five years before he sees the coating thin enough to warrant a retreatment. So your mileage may vary. There's no benefit in having extra material or having it applied extra thick. Shops told us it does take a trained eye can see how much of the material is left at annual inspection.

You can also buy small amounts of either CorrosionX or ACF-50 for spot applications or touch-ups. That might be just the thing for the tailcone of a seaplane or what metal parts a composite aircraft does have that warrant protection.

IT REALLY WORKS

Holoman's Aviation Tech Services does the corrosion treatments for the Collins Foundation on their B-17, B-24, B-25 and P-51. He told us that before they started treating for corrosion, the Foundation was replacing sheet metal with some frequency. That need has all but vanished. "I've never had an airplane owner come back and say it didn't work in 14 years," says Holoman.

Pearson of Lear Chemical sums it up well: "For the longest reaching ROI, this is the least expensive maintenance you can do." Even if that's not a provable statement, we fully agree that corrosion treatments are well worth the cost and time spent wiping up the lingering mess.

Bulletproof Engines: Are There Any?

Yes, say engine overhaulers, and Lycoming's four-cylinder models own the category. Owning one substantially reduces the cost of flying.

by Paul Bertorelli

Next to $5 avgas, the cost of routine engine maintenance and overhauls takes the biggest bite out of the aircraft ownership budget. You can always choose not to paint your airplane or live with ratty seats, but if the engine tanks, you've got an 1800-pound radio stack you can't even use because there's no way to spin the alternator.

Our owner reports on various models consistently confirm what we've always known: Some owners spend a lot less on aircraft maintenance simply because they own airplanes equipped with engines we have often considered bulletproof.

This concept is, itself, a misnomer. Nothing in aviation is truly bulletproof, but it's fair to say that some engines have a better service history than others and, conversely, some are simply money pits. That's not to say they don't perform, but it'll cost you more and reliability will suffer.

DEFINE GOOD

As owning an airplane becomes more of a burden, buyers gravitate toward airplanes that cost less to maintain, even if it requires giving up performance and/or payload. Rather than give up owning an airplane entirely, some owners are stepping down into airplanes that can be maintained without worrying about a giant unexpected engine repair bill. That means picking an airplane with an engine that either Lycoming or Continental got right from the beginning or fixed as the model matured.

Conversely, if cheap and reliable is the primary requirement, some engines are best avoided. That includes almost anything turbocharged, for even if a turbo'd engine makes its numbers—and some do—it will still cost more to overhaul by dint of having the turbocharger.

We define "reliable," as highly likely to make TBO without need for mid-stream maintenance such as cylinders and/or replacement magnetos or other appliances. Moreover, an affordable engine shouldn't have some quirk that makes it expensive to overhaul, such as hard-to-find cylinders or, gasp, a gearbox.

We have our own ideas on what makes a so-called bulletproof engine and to test our theories, we called four of our favorite field overhaul shops to compare notes. The view from inside the engine shop is often quite different from owner (or our) perceptions because they see an unending torrent of broken and corroded engines, many done in before their time. We asked these

In the restart Cessna 172s, Cessna and Lycoming hit the sweet spot with the IO-360-L2A. With fuel injection, no more carb ice and with a strong case and moderate power output, case cracking isn't a problem.

CHECKLIST

- ⊕ Lycoming IO-360-L2A and O-360-A4M lead the league as top picks.
- ⊕ Lycoming gets universally top marks for improved cylinder quality.
- ~ Continental gets just passing grades for the O-470, O-520 and O-550 series.
- ⊖ Lycoming has some clunkers, too, such as the O-320-H2AD and the IO-346.

In our interviews with engine shops, bulletproof and turbocharged weren't used in the same sentence. But one engine that we think deserves honorable mention is the turbonormalized Continental IO-550-N by Tornado Alley Turbos. This powerplant was smooth to begin with and turbonormalizing made it the most efficient large-displacement engine in piston aviation. Reliability has been good, if not quite to the Lycoming four-cylinder level.

shops about their top picks for various categories of engines, from small output four-bangers to the gas-guzzling six-cylinder behemoths that pull a twin into the teens.

There have been some subtle changes in the market since we last did this survey 13 years ago. For one, some new sub-models of existing engines have appeared from both Lycoming and Continental. For another, Rotax has burst upon the scene to dominate the light sport market with its 912-series engines. And then there are the diesels, the Thielert Centurion, the SMA 305 and, lately, the Austro being used by Diamond in the DA42 twin.

The largest factor in engine wear, however, may be reduced flight hours. Because of fuel prices and other regulatory and economic factors, airplanes sit a lot more than they used to. It's not uncommon to see airplanes in annual with fewer than 20 hours flown in the previous year. Depending on climate and owner care, this leads to what has become an epidemic in piston GA: engine corrosion, but especially pitting and spalling of cams and lifters.

AND THE WINNER IS...

Against this backdrop of reduced flight hours and dwindling owner maintenance, can any one engine really rise above the rest as best of the best? Indeed it can and according to our shops, that engine is the Lycoming IO-360-L2A, the 180-HP parallel valve four-cylinder used in the restart Cessna 172s since 1997. The parallel-valve 360s have always been robust engines because they have strong cases and cylinders that aren't expected to deliver high horsepower. Although the basis of this engine has been around for years, it seems to have hit the sweet spot in the new 172s.

"It's a 180-HP engine, it's de-rated and I've had them come in here with 4000 hours on them," says Dave Allen of Poplar Grove Airmotive, near Rockford, Illinois.

"American Flyers runs them for 4000 hours, they put cylinders on at 2000 and a fuel servo and run them another 2000 hours. I haven't seen anything else do that," he adds.

Frequent use explains part of this, since many 172s are used as flight trainers. Even some of the lesser favored Lycomings, the notorious O-320-H2AD used in the 1977 to 1980 Skyhawk, will hold up well if flown regularly, and Penn Yan Aero's Bill Middlebrook told us there are still a lot of H2ADs out there. However, unless you plan to fly an airplane equipped with one regularly—like a couple of times a week—we would avoid this engine.

Middlebrook's top pick, by the way, is a similar Lycoming: the 180-HP O-360-A4M used in the Piper Archer. This is another parallel valve engine. "I compare it to a Chevy 350. It just runs. They've got a solid crankshaft so you don't have any internal rust. Parallel-valve Lycoming cylinders last. It's carbureted, it's simple, it's cheap," says Middlebrook. Penn Yan likes the engine so much that it developed an STC to convert Skyhawks to the A4M, an upgrade called the Superhawk. Although sales of this mod have declined sharply, it's an option for owners who want to rid themselves of an H2AD or who just want more power.

That brings us to another Skyhawk engine and another Lycoming: the O-320-E2D used in the 172 as far back as 1968. When we asked for his top pick, Zephyr Engines' Charlie Melot didn't hesitate to settle on the E2D, but he says he would expand that to include all of the parallel-valve Lycomings right up into the lower-horsepower 540 series.

"I've seen those things with 4000 hours on them. It's amazing what you can do if you can overcome the yellow strip down your back that says 'I'm not gonna fly this anymore,'" Melot told us. "For maintenance, there's not much to do. Keep it in time, keep dirt out of it with a good air filter and change the filter and oil regularly. Nothing against the 200-HP 360, but I'd give the extra 100 hours to the 180-HP 360," he adds.

Speaking of the 200-HP IO-360s—these are found in J-model Mooneys, post-1969 Arrows and the Cardinal RG—aren't they just as good? Not quite. "Case cracking," says Allen Weiss, of Certified Engines in Opa-Locka, Florida.

"There aren't enough new ones coming out to improve the case pool," he adds, explaining that what "good" cases are out there are often tired.

Weiss, by the way, isn't quite as enthusiastic about the IO-360-L2A or the A4M as being truly bulletproof. He said "none of the above" when we asked for his number one top engine. Why? "Because in one out of every three engines we see coming through

here, there's tappet and cam spalling," Weiss answered. We heard this from the other shops as well, but Weiss elevates it to the status of epidemic and bad enough to eliminate any engine from the status of foolproof. He agrees that the IO-360-L2A is the closest to the definition of most reliable.

There is one bright spot. Lycoming's roller tappets—available on many Lycoming engines for new aircraft and for replacement engines in legacy airplanes—appear to be doing well. All of the shops we spoke to have overhauled these engines and report that they show no signs of cam wear that seems to tank flat-tappet engines. While that's a good thing, it doesn't necessarily save money at overhaul because although the cam might not be worn, the roller tappets (at $260 per) are required replacement items.

HOW ABOUT CONTINENTAL?

None of the engine shops we spoke to elevated any Continental engines to the exalted status of the IO-360-L2A. But some come close, such as the venerable O-470 used in the Cessna 182. "The 470? It's upper middle, I'd say," says Certified's Allen Weiss. "I wouldn't put it in the bulletproof category, though. The cases have been around for a long time. There's lots of cracking and lots of old cylinders," he adds. "If you put them side by side, the Lycoming is just a better value pound for pound."

The same advice applies to the six-cylinder 360 series from Continental. These engines get the "just okay" grade from the shops, but aren't exceptional. "Weak cylinders," says Charlie Melot. The IO-550 seems to get better marks. It is, in our view, the smoothest running and most economical engine in GA, with the 520 series running a close second.

But smooth and bulletproof aren't the same thing. Five years ago, we heard complaints in the dozens about Continental cylinders losing compression prematurely. "Now that Continental has put some choke back into the cylinders, that's pretty much over," says Melot at Zephyr. Nonetheless, neither he nor any of the other shops were willing to compare any Continental engine to the best Lycoming four-bangers, even the dowdy O-200, the engine that launched a thousand pilot careers.

WHICH TO AVOID?

If we turn the question around and ask which engines are the opposite of bulletproof, the list is a little longer.

"Any geared Lycoming engine," says Melot, explaining that because Lycoming no longer supports these engines, overhauling them is an expensive frustration that his shop won't take on. The Lycoming O-320-H2AD is another one to avoid, unless you plan to fly it several times a week. So don't buy a late 1970s Skyhawk; there are other choices. Similarly, some shops don't like the Continental O-300 used in earlier Skyhawks, so check on overhaul options before buying one.

"Let's see," says Allen Weiss, "the IO-346 in a Musketeer, the GO-300 in the Cessna 175, the H2AD and GTSIO-520-C in the Cessna 411. We might still do them, but I have to be talked into it." Some shops won't do the E-series engines found in early Bonanzas, such as the E-225. But Dave Allen says Poplar Grove specializes in these engines, at a slight premium. Poplar Grove has some FAA and DER approvals to bring the engines back into new limits.

"But it's a dying market. We used to do one almost every month, now I'm lucky if I do half of that," says Allen.

Which leads us to conclude with the best advice we've heard in awhile, from Charlie Melot: "Don't buy something that's cheap with an engine outside the mainstream without talking to engine shop about overhaul options first."

ROTAX AND THIELERT

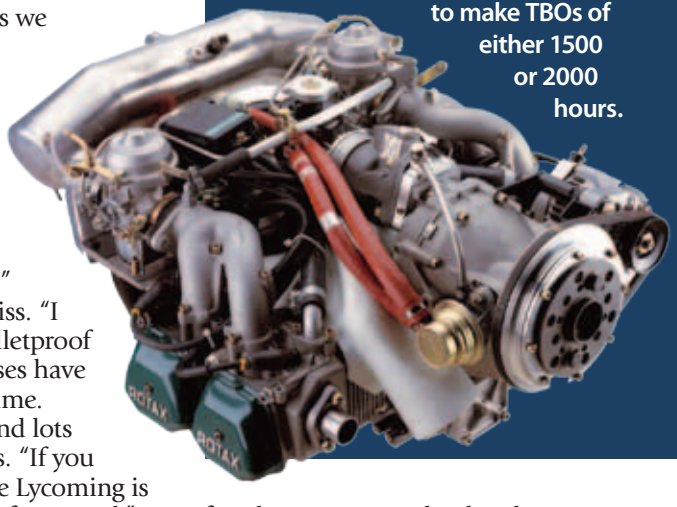
No, we haven't overlooked our friends in Europe: Rotax and Thielert/Centurion. The latter didn't exist in the market when we last examined engine reliability and although Rotax was out there, it didn't enjoy the marketshare it does now. It remains the engine of choice for light sport aircraft.

Traditional engine shops have no visibility with the Rotax 912 engines. As we reported in the December 2011 issue of *Aviation Consumer,* Rotax overhauls are tightly controlled by two outlets in North American, Canada's Rotech Research and Lockwood Aviation Supply in Sebring, Florida.

Owner reports suggest that Rotax engines do tend to make TBOs of either 1500 or 2000 hours. They don't suffer the cam/tappet corrosion issues that plague Lycomings, nor the valve guide and cylinder problems that often trouble Continental engines. On the other hand, they don't put out the same power of the typical Lycoming or Continental engine.

One issue with Rotax engines, however, is overheating. Although the cylinder heads are water-cooled, the cylinders are air cooled and overheating can warp the fit between the two. If this happens, the engine is done. Despite having a gearbox and clutch, the Rotax engines don't seem to have problems with these components.

But the only large volume aircraft diesel, the Thielert Centurion, has had problems with its gearbox and clutch mechanisms. But six years into the product cycle, the company says these have mostly been sorted out, although the engine is still limited to a TBR of 1500 hours, with a petition for 1800 pending. There's no overhaul; just complete replacement at about $39,000. That's expensive for a four-cylinder. On the way to TBR, the engines require replacement fuel pumps, gearbox inspections and clutches. We don't think these engines are at the bulletproof level yet, but they may get there eventually.



AVIONICS FLIGHT TRIAL

Dynon Skyview: Budget Sophistication

Expandable glass for LSAs with a rich user interface, high-res displays and dynamic autopilot integration. It's priced right, too.

by Larry Anglisano

CHECKLIST

- ⊕ High-res screens and speedy architecture
- ⊕ Excellent autopilot functionality
- ⊖ Weather and charts a major missing recipe in the interface, for now.

An icon in the experimental market, Dynon Avionics has built a reputation for offering cutting-equipment that's easy to install and widely compatible. Dynon's value-based pricing is practically a smack in the face of the certificated world, where twice the price gets you half the capability.

Skyview represents a fully integrated cockpit suite whose nearest equal is something at the G1000 level. Retrofits are fair game in nearly any LSA and experimental, and it's a top seller for new LSA purchases.

CONFIGURATIONS

Skyview is available in dual or single screen configurations, and with a choice of two display sizes and types (the suite can support up to four displays). Skyview displays and remote boxes are efficient on space; each display requires about 2.5 inches of free space behind the panel plus room for connectors, which are the standardized nine-pin DB9 variety. Data is tossed between displays with efficient (if pricey) Ethernet cabling. Five general-purpose RS-232 serial ports connect to GPS receivers (yes, portable navigators, too), transponder and navigational radios such as the digital Garmin SL30.

The identical screens in a multi-screen setup serve double-duty as a PFD/MFD combination with flight instruments, engine display, autopilot command and mapping. Equipping with dual screens provides backup redundancy for both screens and adding a second ADAHRS. Single-point failures are further squashed with two independent buses and dual power buses. Additionally, a backup battery can be interfaced with each display to provide 30 minutes of power. ADAHRS performance is good—with valid flight data up and ready to rock within 20 seconds of boot-up.

You won't have to eyeball the Skyview displays for long before being impressed with their screen quality. SkyView displays utilize LED backlighting technology that Dynon says will increase lifespan, allow for more uniform brightness, improves dark-cabin dimming all while reducing power consumption—a concern for many LSAs with puny electrical systems. For smaller panels, the SV-D700 display sports a seven-inch, 800 by 480 pixel, 1200 nit TFT ac-

tive matrix LCD screen. The larger SV-D1000 is a big 10.2-inch, 1024 by 600 pixel, 1350+ nit TFT active matrix LCD screen. We looked at both screens splashed by bright Florida sun in several LSA cockpits and found them to perform well.

RICH USER INTERFACE

Dynon worked hard to improve the user interface over earlier systems. User input to the Skyview is accomplished with two bezel-mounted joysticks plus eight soft key buttons along the bottom of the display's bezel. The controls have a positive and hearty feel, but we found the joysticks awkward. Joystick input results in an immediate screen action with speedy map redraws and fast menu hops thanks to powerful processors.

At first blush these displays are busy with information. But we found the screen layout to be reasonably intuitive with menus a manageable three levels deep. At the top of the display there's a data bar that's user configurable and displays important textual information, including the mode status of the autopilot.

SkyView can display many combinations of PFD, engine and moving map data in full-screen and split-screen configurations, as well as distribute this data across multiple displays.

For example, you can customize the screen to display flight instruments, terrain and engine data or toggle some of it off altogether. Do you prefer a full-screen engine presentation, or half engine data and half map, or half flight instruments and half engine? You get the point; the choices for layout are liberal.

In a dual-screen configuration the system synchronizes the most important information between the two displays so setting baro, bugs, engaging the autopilot, or acknowledging warnings only need to be done on one display.

PFD PANACHE

A quick glance at the Skyview's PFD function reveals a familiar glass-panel layout with all the perks. With a valid OAT probe and GPS signal, the winds-aloft arrow indicates the wind direction relative to your current direction of flight. The wind strength, direction and crosswind component are displayed in basic text format. Altitude and heading bugs are conventional (and can drive the optional Skyview dual-axis autopilot, which uses the Dynon roll and pitch servos).

The altimeter incorporates a convenient density altitude readout, although we think it's unfortunate it's just labeled "DA," which is confusingly akin to the DA for an instrument approach. The VSI function is refreshingly easy to interpret. This bug is used as an initial target for the pitch axis of the autopilot, when interfaced. Want to synch up the bug with the current vertical speed? Press the VSPD using the joystick for two seconds and it's in sync.

AC TV

For a video demonstration of Skyview recorded at Sebring 2012, log on to www.avweb.com and select the video index. Or, to go directly to http://snipurl.com/22598nx.

Some Skyview functions are, well, different. The HSI display is mostly traditional with a magnetic compass rose (with cardinal points displayed in letters), heading bug and a rate of turn indicator. A cyan-colored ground track GPS pointer is located on the inner area of the compass rose. Comparing GPS track to your heading quickly shows the difference between where the aircraft's nose is pointing and where it's actually going over the ground. However, a track bug replaces the familiar heading bug when the autopilot is flying in GPS ground track mode.

Anytime a GPS is being used as an HSI source, the HSI D-bar (CDI) is colored magenta. When a VHF radio is being used as the source, the D-bar is green. A text label verifies what data source is displayed, and each GPS or radio source is numbered to

Dynon's hardware is rugged and sturdy right down to the pre-fab wiring harnesses. The displays host USB ports for loading software. Remote units are space-saving, but getting the ADAHRS in the right spot for interference and mounting requirements while still plumbing it to the pitot static (and AOA) systems can be an installation challenge.

prevent confusion in systems that have multiple devices. The NAVSRC softkey on the PFD selects the source. Skyview connects to a variety of remote nav sources, including the GNS430/530 series using the ARINC 429 adapter box.

VIRTUALLY REAL

Synthetic vision is practically required for a glass panel, and Skyview presents it well on those big, crisp displays. We won't cover the specifics of synthetic vision here to save space, but Skyview does a decent job of playing the familiar flight path marker (depicting the actual trajectory that the aircraft is flying through space), synthetic runway and surrounding environments—painted an eye-catching yellow or red as they become a threat.

The Skyview comes standard with a basic topographical map display that shows advisory terrain color-coding and basic active waypoint information when driven by an external GPS. But the addition of Dynon's $200 GPS module and one-time $500 Navigation Mapping Software adds an advanced embedded GPS navigator function and an extensive aviation database for interactive on-screen navigation. When we asked Dynon why this wasn't included as standard, they noted that most Skyview suites share space with a dedicated GPS the likes of a Garmin 696 or aera796, and owners want the option to save some money. We think it's a worthy option given the price, but heartily appreciate Dynon's frugal-owner thinking.

Mapping is accessed through the MAP softkey and, if the software is enabled, you'll get a complete aviation and obstacle database that displays airports, runways, navaids, airspace, obstacles and other aviation data on the moving map. Advanced mapping functionality enables Skyview to provide detailed information about aviation features and on-screen navigation to these features.

Speaking of data, SkyView utilizes terrain, obstacles and navigational databases that are, refreshingly, provided by Dynon for free right on the Dynon web site. See if you can find such a deal in the certificated avionics world. Data is easily downloaded to the system utilizing USB ports in the rear of the display. In SkyView systems that have more than one display, databases are automatically synchronized.

TOTAL ENGINE MANAGEMENT

Skyview is compatible with Rotax, Lycoming, Continental and several less-common engines. Engine data comes via the SV-EMS-220 engine-monitoring module and related sensors. It supports many parameters including RPM, manifold pressure, oil temperature and pressure, EGT, CHT, fuel levels for multiple tanks, bus voltage, current, fuel pressure, fuel flow, carburetor air temperature, coolant pressure and temperature, flap and trim potentiometers, external contacts and general purpose temperature sensors.

There's also an interface for the Vertical Power VP-X electrical monitoring. Further, the installer can custom-configure the engine gauge presentation and location of the gauges on the screen.

Keeping the integration ball rolling, Dynon offers two remote transponders that can be remotely controlled from the PFD in a dedicated transponder window. This saves space in the radio stack, adds another level of integration and streamlines the installation because SkyView feeds computed pressure altitude directly to the transponder, eliminating the need for a separate Mode C altitude encoder.

Dynon's 262-series is a Class 2 Mode S transponder that is limited to ops below 15,000 feet, under 175 knots—and outside the U.S. Use the 261-series unit otherwise. When connected to a capable GPS, the units will output ADS-B through 1090ES.

SkyView can also pull aircraft traffic data from several different devices, including the SV-XPNDR-26X, the portable Zaon XRX, and the popular

Skyview displays impress in clarity and completeness. Note that both autopilot and transponder are driven from this PFD with data displayed at the screen's top. You can also share this screen with engine gauges or a top-down map. The ladder-like item by the airspeed strip is angle of attack. The yellow ball on the far right is traffic 200 feet below and climbing.

Garmin GTX 330 Mode S transponder.

ENVELOPE PROTECTION

One Skyview function that tickled our fancy was the optional display of instantaneous G-loads on the airframe. Eyeball the airframe of some of these puny LSAs (especially the aerobats) and the G meter could be your most used feature of the Skyview. When it's displayed, it replaces the HSI (a numerical magnetic heading value remains on the screen). The G meter shows an analog "needle" that indicates the instantaneous G loading of the aircraft.

Depending on how the G meter is configured, the analog range may have yellow and/or red caution ranges configured to visually indicate aircraft G limits are being approached. Further, the meter can be configured to appear automatically when G loads exceed a preselected threshold. An angle of attack indicator will display on screen when a Dynon AOA/pitot probe is installed.

To avoid airframe (and pilot) overstress in the first place, SkyView paints big, red horizon-pointing arrows on the PFD at pitch attitudes of ±45 degrees. Indicators are accompanied with a small piece of sky or ground bordered with a white dashed horizon line, depending on the current attitude. The pitch warning indicators can be enabled or disabled through the setup menus.

Like most GA glass panels, the attitude display leans on airspeed input to ensure accuracy. In the event of pitot blockage and loss of airspeed, Skyview will show a magenta GPS ASSIST message on the PFD, and the ground speed is displayed below the indicated airspeed slot. And if the electrical system itself goes south, an optional backup battery can power one SkyView display (but not the autopilot) for at least 60 minutes.

CONCLUSION

An entry-level Skyview has a starting price of $4800. (No, there's not a zero missing from that number. But remember this is LSA and experimental aircraft only.) A full suite with dual screens and autopilot servos can top $12,000.

As impressed as we are with the Skyview, there are some nits to pick. As we go to press, Skyview doesn't have satellite weather or electronic charts—features that might be seriously lacking for most buyers that expect it in a system of this caliber. Dynon says it's holding off on these features to perfect the interface.

On the plus side, we're impressed with display quality and autopilot automation and the ability to play data in various configurations. Whether or not this type of automation and advanced equipment makes sense in a stay-local, VFR-only LSA is questionable, although manufacturers we spoke with all seem to agree that buyers want integrated glass and lots of it.

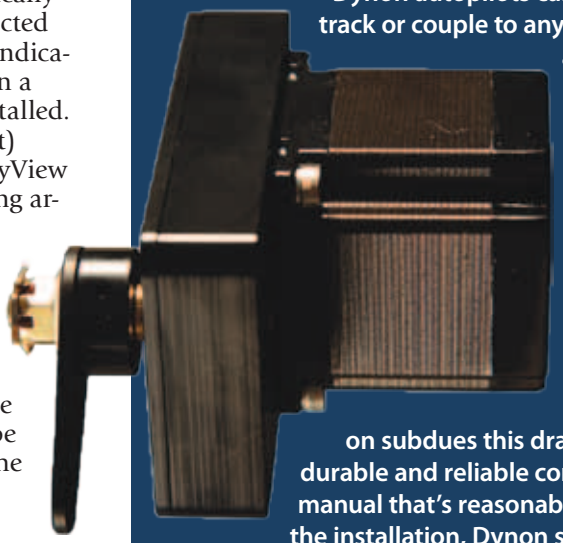
From what we see, with Skyview they'll get just that, and with a performance and price that will leave certified-panel owners drooling.

AN AUTOPILOT WITH A PH.D.

Adding an autopilot to a Skyview system requires no more than the addition of a Dynon roll and pitch servo at $750 each. Try that in the certified world. Got servos left over from earlier generation suites such as the Dynon D100? They'll work with a software upgrade and some additional wiring.

Every servo is managed by its own microprocessor, which adds intelligence to the overall autopilot operation and longevity to a component that works hard for its keep. The servos are built in a lightweight aluminum case and with a stainless steel gear train to respect LSA weight issues. The servos are designed for pilot override, and Dynon built in a shear pin to let you break the servo free from the controls if necessary.

When the autopilot is engaged and aircraft airspeed drops below a set minimum airspeed, the autopilot enters an airspeed hold mode, pitching the aircraft down to prevent dropping below the minimum airspeed. When the aircraft's altitude drops below the bugged value and the autopilot cannot pitch the aircraft up without going below the minimum airspeed, an ADD POWER warning appears. Trim position sensing and annunciation is standard. There's also "Pitch Trim' annunciation on the PFD alerts the pilot when the pitch servo detects excessive load. This can stave off an unexpected pitch change that comes from disengaging an out-of-trim system.



Dynon autopilots can fly heading, a specified GPS ground track or couple to any connected compatible radio or GPS. You also get GPSS digital steering, altitude select and hold, control wheel steering and an emergency 180-degree-turn function. The system can even obey preprogrammed bank-angle and turn-rate values. That's more than many big-airplane autopilot can boast in a system that's designed for simplicity.

Speaking of simplicity, it's not fair to call any major avionics installation easy. To be sure, the Skyview is a major system that requires a solid installation. But Dynon subdues this dragon with prefabricated wiring harnesses, durable and reliable connector housings and an installation manual that's reasonably straightforward. For the final stages of the installation, Dynon supplies a dedicated network cable that is intended for bench mockup testing. Being involved in our share of retrofits, we attest that this is valuable for amateur and professional installers alike.

CONTACTS

Dynon Avionics
425-402-0433
www.dynonavionics.com

Cockpit Apps for Droid? Try AviationMaps

None of the Android aviation apps match the top players on the iPad, but two small shops are closing the gap and the big iPad players are moving in soon.

by Jeff Van West

The iPad cockpit revolution is a bit of a nightmare for us as we try to keep pace with the dizzying array of new and updated apps vying for space on your lap, and subscription money from your wallet. Now that Android-based tablets are on the market in force, the choice spectrum has widened further. Dizziness has turned into utter vertigo.

We're diving in nonetheless because Droid opens up many possibilities for tablet size, integration of other hardware and lower price.

NAVIATOR

Naviator covers all the critical bases: it offers a moving map with a background layer of VFR sectionals, TACs, or IFR en route charts. Approach plates are included, with an option to have them georeferenced (your aircraft position appears in the plan view) for an additional fee.

Basic weather and TFRs download automatically. METARs, TFRs and AIRMETs/SIGMETs appear on the map. TAFs appear only in the detailed airport information, which is basically the same data you'd get from the A/FD. That's it for weather, so you'll still need another app to get NEXRAD, NOTAMs and the like.

The moving map view shows your speed, track, distance to next, and ETE to next at the screen corners akin to the Garmin 496 family of GPS navigators. You have the option for layering on runway extensions, a compass rose and a predictor line showing where you'll be in a user-determined number of minutes. (We like a three-minute line ourselves.) Naviator's map will pinch zoom, but we found performance was inconsistent. The on-screen buttons worked better.

Charts are not stitched together, so you need to tell Naviator which chart you want to see, and which side if it's a two-sided sectional. This can be cumbersome when crossing from chart to chart. It does, however, mean you can read the chart borders for information like MOA altitudes and effective times.

In a smart feature for tablets, there's a button to toggle on and off a two-thirds/one-third split screen. This is a great feature for keeping the map in view while calling up airport information or viewing an approach plate simultaneously with the map. Naviator is smart about its screen taps: a short tap on an airport calls up quick info or lets you make a fast direct-to, with an option to show detailed info in that split screen. You can also add to your route this way

That said, we think calling Naviator's flight planning tools weak

Naviator uses screen real estate well and offers georeferenced approach charts. We think flight planning, airport information and navigation of the app have much room for improvement.

would be an understatement. Entering a long route is easy enough, although it doesn't decode airways for you. But editing—particularly inserting a waypoint—is so cumbersome that it's easier to just reenter the whole thing. There is an option for editing directly on the map, but it's only a slight improvement.

Getting an approach plate in view is also a multi-tap process that could be streamlined. We do like Naviator's quick expand for approach charts that lets you fill the screen at tap and then drop back to split-screen view.

Naviator is a good value at $5/month or $50/year. Georeferencing is through a separate subscription from Seattle Avionics at $75/year. The app can be installed on two devices for one subscription price and there's a free 30-day trial.

AVIATIONMAPS

Avilution's AviationMaps is our top pick for an aviation app on Android, because it's the most capable overall and the easiest to use, in our opinion.

AviationMaps has the FAA chart of your choosing base map that's standard for these apps, with your aircraft and route superimposed. The app also lets you layer NEXRAD, METARs and winds aloft at various altitudes on the map. The NEXRAD looks great, but METARs are shown with cute suns or clouds rather than a graphically easy color code for VFR/MVFR/IFR/LIFR that's become the industry standard. This makes reading weather at a glance a chore.

Toggling between map types is done through an easy pull-down menu, Charts are seamless, which makes panning easy, but Avilution has yet to add back in all the information from the margins back into airport information pop-ups.

Tapping an airport offers the same smart response you get from Naviator. A short tap reveals critical data with a second tap opening up the airport information page with all the details. A long tap offers route editing, but AviationMaps is smart enough to offer inserting, appending or direct-to for the waypoint. This makes route editing a snap.

AviationMaps has a 50/50 split screen option it uses well, allowing you to expand or collapse either half of the screen at a tap. Also available

We think AviationMaps is currently the top app for Droid, with a flexible interface and features. It lacks georeferencing and could display on-map weather better.

at a tap are screen lock, night mode and a search that can double as a nearest.

Flight planning is a mixed bag. There's no way to enter your entire route with airways at once. You can, however, enter a couple of waypoints to get on an airway and then load the airway to an exit point. The problem is that Avilution doesn't scroll to your position of entry so you're scrolling through a lot of waypoints if it's a long airway before you find your exit. There's also no option to skip unnecessary intermediate waypoints.

One item we really like is that retrieving the weather for an airport (via the internet) pulls up a real trove of data including radar summaries, METARs, TAFs, the area forecast, NOTAMs, freezing levels, and TFRs. PIREPs are notably missing though.

Approach charts are accessed via the airport information and can appear in the split or full screen, but there's no option to have them georeferenced yet. One slick feature is that approach charts you recently viewed get added to the list of charts you can select in the upper left of the map view. This makes for quick toggling to and from an approach chart as needed.

Two other novel features of AviationMaps are the runway-find function and the flight pad. Runway find gives you a top-down picture of your current approach angle to the destination runway—that's runway, not just airport. The flight pad is sort of a digital kneeboard where you can record the ATIS information for departure and destination. It would take some practice to use it at the real speed an ATIS is read, but it offers quick access to relevant departure and arrival procedures. We'll call it a not-quite-there feature that's got potential.

Just like Naviator, AviationMaps is a great deal at $5/month. It's not

LIKE A DROID IN A CANDY STORE

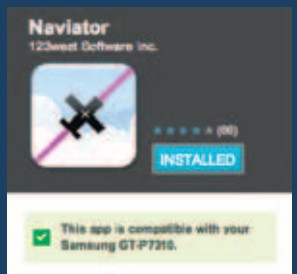
In a Dickensian "best of times, worst of times" way, the beauty and curse of going the Android route for a tablet is that you have many more options. All these current and coming aviation apps are great, but which tablet should you buy to run the damn things?

We have no idea. But we won't let that stop us from offering some advice. One of the complaints many pilots have with the iPad is it's just a bit too big. It's OK in the lap, although it can be too much if you also want a real pad of paper there. But it gets heavy to hold up for more than a minute and seems to always block some instrument if you mount it anywhere on the pilot's side of the cockpit.

Android tablets span the gamut from seven-inch (big phone) size up to 10-inch tabs that are essentially the same size as the iPad. Searching for the Goldilocks sweet spot, we did our testing on a Samsung Gal Tab 8.9. This tablet sports the same specs as the Samsung Gal Tab 10.1, which several app makers recommend, but with a smaller screen. The Gal Tab 8.9 turned out to be just about perfect size-wise, as it was easy to read an entire approach plate without zooming and big enough to test split screen features, but just smaller enough than the iPad to handle comfortably (and even slip into a kneeboard pocket).

Ah, but the 8.9's "Gingerbread" operating system is behind the cutting edge "Ice Cream Sandwich." (We'd ask what they were smoking when they named these things, but it seems pretty obvious.) Also, the memory and processing power are clearly challenged by the moving map apps when the screen gets busy.

We seem to be on the verge of two revolutions in Droid tabs as well: OLED screens and PenEnabled interfaces. OLEDs have the promise for much better sunlight readability. Samsung seems to be leading the way with these and may have an 8.3-inch tab with one in the U.S. this year. Other options will surely follow. The PenEnabled tabs have a combination interface that uses a normal touchscreen until you bring a special pen near the screen. Then the touchscreen disables and you get a super-accurate pen interface. Anyone who's used a Waccom tablet or TabletPC will recognize these. This make writing on the screen a practical reality, rather than the etch-a-sketch bumble of drawing with your finger or capacitive pen.



Multiple versions of hardware and OS mean not all apps work on all systems. Watch for the compatibility note before you buy from Android Market. This is no guarantee it will work *well*, just that it should at least run. Also know that Kindle Tabs must purchase through the Kindle store and not all apps will be available.

Android tablets also use GPS receivers of varying quality (our Samsung was so poor as to be essentially useless in flight). Bluetooth GPS works with Android. We flew with the Dual XGPS 150, which works for both Android and iOS. It's a bit of a chore getting it configured, but after that performance was rock solid.

available on Google's Android market as of this writing due to a conflict with Google. But you can get it directly from the developer's website—a work-around you couldn't do on a iPad without jailbreaking it.

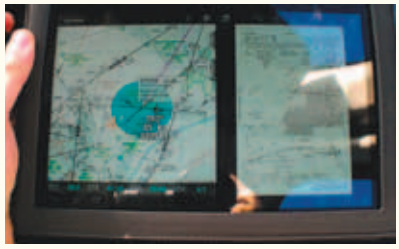
IT'S NOT PILOT MYCAST

Garmin's new Android app doesn't have a name yet, but it's clearly an evolution of Pilot MyCast. We reviewed the early alpha build, and it's definitely striving to be an equal to the quite-capable MyCast for iPad. (For those outside the computer cognoscenti, an alpha means it's a work in progress.)

MyCast grew out of a flight-planning app into a moving map tool, so it's no surprise this app's weather and flight planning abilities excel. Enter your route as airport to airport or with airways and it does the rest. Filing the flight plan can be done right from the app—something no other app we tested could do. There's a split screen, but it's strictly for briefing data, with widgets for METARs, winds and other items. Scroll a time slider on the screen and the appropriate item for that point in your flight shows up.

The basemap includes the charts you'd expect plus WACs (handy when VFR and looking at large areas) and a plain background with state borders, which is good for weather analysis. You can layer PIREPs, NEXRAD and many other weather

AC TV



For video of these apps, including two extra ones aimed primarily at European pilots, go to http://snipurl. com/22595jq. Or log on to www.avweb.com and select the video index.

features on any chart, but only one layer at a time. In the air, the app shows your position, route and data in eight, user-configurable fields.

One big miss in the version we looked at is you can't tap a map item, such as an airport, off your route and quickly get airport information. There is a nearest option for the direct-to function, but it would be nice to just quickly look up airport info before deciding to head that way. Pilot MyCast iPad version also lacks this valuable feature.

The app will include approach procedures, but they weren't integrated yet so we can't say how easy it will be to flip between an approach and the moving map. MyCast for iPad doesn't handle this gracefully, in our view, so it's unlikely to be a strong point. The Android app also lacks the more general weather maps and advanced flight planning of iPad MyCast, but these may be added to the final Android app.

Whatever its name will be, it will have Garmin's relatively Cadillac pricing of $10/month or $100/year. Approach charts will be $50 extra, but they'll be georeferenced. Garmin's georeferenced Safe Taxi diagrams will cost an extra $30. The new app will be available about the time of Sun 'n Fun. The current, simpler MyCast for Android will be pulled from the market, but those subscribers will get an upgrade that honors the single lifetime fee they paid. Approach charts or Safe Taxi will still cost extra.

Because we only saw the developmental alpha, we can't pass final judgment on MyCast. But it's absolutely a contender worth watching.

OPENFLIGHTGPS

If you just need to see your position on an FAA chart and don't care about instrument approaches, OpenFlightGPS might be for you. For a one-time fee of $30, you get WACs, sectionals, terminal area charts, low en route charts and even VFR flyways. Your aircraft position shows on all but the flyways.

These are not stitched-together charts, so the margins are there for the reading. You have to change charts manually as you fly from one to the other, but the app makes it simple with a one-tap way loading of the adjacent chart.

Garmin's app will soon be nearly as full featured on Android as MyCast on the iPad, which would make it a feature leader. It's a pricey option, however.

There are no frills here. You won't get any more information about a waypoint than what you can read right off the chart. Flight planning? Uh, no. You can create a route by tapping points on the virtual paper and OpenFlightGPS connects the dots. Put the dots close to the waypoints you want.

Selecting charts for download is cumbersome in that it tries to immediately download each chart you want, rather than letting you select a set of states and download at once like other apps. Another lurking problem with OpenFlightGPS is that when Aeronav starts charging for charts, the company will need to switch to some subscription system or stop updating its charts. It's worth remembering that the uncertain future of Aeronav data costs will affect the yearly cost of all these apps, iPad and Android alike.

OTHER PLAYERS

WingX has an app for Android, but it currently lacks a moving map, so it doesn't make our cut for this review. They will build out to match or even exceed the capability of the formidable WingX for iPad. We'll review it when those features are ready. Jeppesen has a Droid version of their app in the works, but won't commit to a timeline or feature set.

What of app industry leader ForeFlight? "ForeFlight is not planning to port ForeFlight Mobile for iPad to Android tablets. A small team like ours can only tackle so much and keep quality high across all products," says ForeFlight president Tyson Weihs.

Given that all these app makers save Garmin are small shops, competition plus the Damoclean sword of Aeronav pricing clouds the future of Droid apps. But for Droid tab owners looking for a cockpit companion today, there are good options.

CONTACTS

Aviation Maps
Avilution
www.avilution.com

PilotMyCast
Garmin Digital Cyclone
www.digitalcyclone.com

Naviator
123West Software
www.naviatorapp.com

OpenFlightGPS
Cañones Software
www.softoutfit.com/openflightgps/guide.html

Tax Considerations: Biz Aircraft Deductions

2011's 100 percent bonus depreciation can apply not just to new airplanes, but new upgrades. With 50 percent in place, 2012 is still a good time to buy new.

With the 100 percent bonus depreciation rule in effect, 2011 was a good year to buy a new aircraft for business use. But to claim the benefits of the bonus, you need to get your filing details in order and not overlook the record keeping necessary to justify the bonus claim. Further, to avoid getting afoul of the IRS, it's critical to understand what business use really is.

As for 2012, the bonus will be 50 percent, but if combined with allowable expensing elections, you can still claim a sizable chunk of depreciation to reduce your tax burden and make the cost of a new airplane for business use more appealing than it otherwise might be.

For this brief report on tax filing and planning for aircraft ownership, we contacted Scott Horton, an attorney and CPA whose www.aircrafttax.com business specializes in business aircraft ownership and tax issues.

2011 CONSIDERATIONS

Although 2011 is behind us, filing a return may not be, so Horton offered some pre-filing tips. As part of a larger stimulus package, Congress approved 100 percent bonus depreciation for any new aircraft or new upgrade placed in service in 2011. The bonus means that you can apply the full purchase price of the airplane as a deduction in a single year, rather than using the more conventional five-year accelerated depreciation schedule or six-year straight-line method.

"You don't have to take the bonus," Horton told us, and for some taxpayers, conventional depreciation might be more advantageous. However, if the full bonus is applied, it can be used to show a loss, which may allow the taxpayer to amend prior year returns and get money back.

Bonus depreciation applies only if the aircraft has 50 percent qualified business use. That means that at least 50 percent of the hours flown on the newly purchased airplane were documented business use, but there are some business flights that may not count as qualified business use, such as a business flight operated under a lease from a related party. That is a contentious area that the IRS is currently reviewing.

And the documentation is important, a detail some filers forget. You can organize it after the fact, but you'll need to keep good records. "On audits, you must show evidence of the purchase price to show the basis you used for the depreciation," Horton explained. "You need to maintain flight logs, showing the date of the flights, the flight time and route of travel, the purpose of the trip, the number of passengers on board the aircraft and their purpose for making the trip."

In addition to flight logs, contracts, purchase orders, proposals and the like are good supporting documents that will make an audit less stressful if one actually occurs. Plan to provide

Fancy a TBM 850 for your Widget sales efforts? The 2012 tax code allows 50 percent bonus depreciation to take the sting out of buying.

CHECKLIST

- 2011 was a good year for new purchases, but new upgrades can be deducted after the fact.
- Deductions require 50 percent business use, but some personal use is allowed under certain circumstances
- Bonus depreciation will continue through 2012, but at 50 percent.
- You still have to come up with the money to buy the airplane.

these documents for your accountant, if needed. "These are things on audits that will absolutely be asked for up front," Horton says.

In addition to the bonus option, aircraft owners can also reduce tax liability by taking what's called the Section 179 Expensing Election. This applies to both new and used aircraft and related equipment. For 2011, says Horton, you can deduct up to $500,000 for an aircraft-related purchase, provided that the total capital assets placed in service don't exceed $2.5 million. For 2012, the expensing election is reduced to $139,000, phased out at $700,000 in capital asset additions.

"But a key difference here is that you can't use the 179 election to create a loss. You can only use it to absorb income. But unlike the bonus, it's not all or nothing. You can elect any amount between zero and $500,000," Horton said.

LOOKING FORWARD

The coming year will be a 50 percent bonus period and although that's not quite as attractive as the 2011 tax code, it is, nonetheless a strong incentive to buy a new airplane—if you can justify it—or upgrade an airframe you already own with new avionics or other improvements. Moreover, the 50 percent bonus can be combined with the Section 179 election to reduce tax exposure. The law requires that Section 179 expenses are applied before the bonus.

"So the example is that if you installed, say a new G600, for $30,000, off the top under 179, you could take the entire amount. You wouldn't even need to use the bonus because the 179 election would absorb the entire amount," Horton says. (As a rule, the bonus applies only to new property, while Section 179 elections can apply to both new and used.)

For a new airplane, let's say a $500,000 Cirrus, you could apply the $139,000 off the top under Section 179 to reduce your basis to $361,000, half of that total —$180,500—under the 50 percent bonus depreciation and another $36,100 under conventional depreciation for a total of $355,600, or about 71 percent of the cost. For some businesses, even this amount might easily justify the expense of a new airplane purchase.

There are various ways to structure the ownership of a new airplane, but Horton told us he favors what he calls the parent-subsidiary structure, as long as the owner's facts support it. That means that the entity that owns and operates the airplane is a wholly owned subsidiary of the operating company that uses it for business.

New upgrades, such as the Aspen suite, above, qualify for bonus depreciation in aircraft used at least 50 percent for business.

"That way, the cost of the aircraft flows into the business as an expense and reduces the taxable income," says Horton. Some problematic tax issues such as the passive loss rule, hobby loss and related party leasing are less of an issue with this structure. In addition, the IRS is used to seeing such arrangements and they don't raise as many red flags as a stand-alone entity that reports a large loss.

"Also, from a sales and use tax standpoint, it's very good to have a leasing structure where the aircraft is dry leased from the owner entity to the operating business. That way, you can usually significantly mitigate sales tax," Horton adds.

STATE TAXES

Which leads us to the issue of local taxes, mainly state sales and use taxes. Horton says many owners have been bitten by large tax bills they didn't expect because of a poor grasp of state sales tax laws.

"I heard this literally five times at Sebring. People were telling me they don't worry about sales tax because they have the airplane registered in a Delaware LLC and Delaware doesn't levy sales taxes," Horton said.

True enough. But what matters is where the airplane is based and used. In these cases, the state may come sniffing for revenue, to the extent of sending tax collectors to airports to record N-numbers.

"In California, for instance, the sales tax on a new Cirrus would be nearly 10 percent or $60,000," Horton says. The better way, says Horton, may be to take delivery of the airplane in a state that has a fly-away sales tax exemption, so that the state doesn't charge sales tax for an airplane bought there but used elsewhere. And where possible, it's smarter to elect to pay taxes on aircraft rental income through the dry lease subsidiary than a $60,000 tax bill up front.

Although an aircraft buyer might purchase an airplane for business use and meet the test of 50 percent qualified business use in order to take accelerated depreciation, that doesn't mean the buyer can't use the aircraft for some personal use. But an owner needs to be careful here.

Generally, the percentage of flight time attributed to personal use will result in a proportional disallowance of aircraft expenses. In other words, if you use the aircraft 20 percent of the time for fun, you will lose 20 percent of your aircraft-related deductions, including depreciation. In a year where an owner takes a large depreciation deduction, that can be a huge hit.

An owner might be well advised to carefully document some personal use as legally allowed fringe benefit flying, a solution that may work for some businesses when the nature of the flight is not recreation, such as going to a medical appointment or checking on a personal investment. In this case, the IRS allows the business to deduct the aircraft expenses for those flights as long as the owner recognizes some income based on a standard cost-per-mile formula.

Aircraft expenses are usually much more than the owner's fringe benefit income tax hit and, when utilized properly, making the claim keeps everything above board with the IRS.

Cessna 195

An affordable, round-engine classic that set the standard for business aircraft.

by Coyle Schwab

How many classic airplanes can combine useful basic transportation utility with the panache of a big, belching radial engine? We can think of only one: The venerable Cessna 195 Businessliner. (Cessna named it that for a reason. It really was one of the first business aircraft.)

Many vintage aircraft are indeed works of art, but the 195 is actually a practical classic. One owner refers to his 195 as "a Cessna 206 that gets preferred parking at the fly-in breakfasts."

A direct descendant of the 1934 C-34 Airmaster, the C-190 series represents a lot of Cessna heritage—it was the first all-metal Cessna and the first to fly with the Wittman spring steel landing gear, and the last Cessna to be built with a radial engine. When you arrive on the ramp in a 195, heads turn. Best of all, 195s are relatively affordable to buy and support.

BEGINNINGS

The Citation of its day, the 190/195 wasn't a huge seller, but there are plenty of examples flying. Cessna cranked out 1099 variants of the 190 series—190s, 195s and military LC126s—from 1947 through 1954. Nearly 80 percent were 195s. In 2012, the FAA registry lists 669 registered 190-series aircraft, but nobody's sure how many are airworthy.

When you arrive on the ramp in a 195, heads turn. Best of all, 195s are relatively affordable to buy and support.

The main distinction among the models is the engine. The 190 had a Continental W670 radial pounding out 240 HP and was alleged to be Cessna president Dwane Wallace's personal favorite. The others had Jacobs R755 engines of either 300 HP, 275 HP or owner-furnished 245 HP. Most of the 195s were originally equipped with the 300-HP engines, but many have been retrofitted with 275s or 245s.

There are still quite a few of the smoother-running Continental-powered airplanes flying, but about half have since been converted to 195s with the Jacobs engines, since the support for the Jake is better. Owners report that the performance is comparable between the 190 and the "little" 245-HP 195, while the 275-HP and 300-HP 195s are, of course, peppier.

The C-195B's 275-HP R755-B2 engine is generally considered to be the most reliable of the group, even though all three of the Jacobs engines have the same displacement. The 300 got a deeper intake manifold to get its extra 25 horses, which seems to make it more susceptible to case cracking.

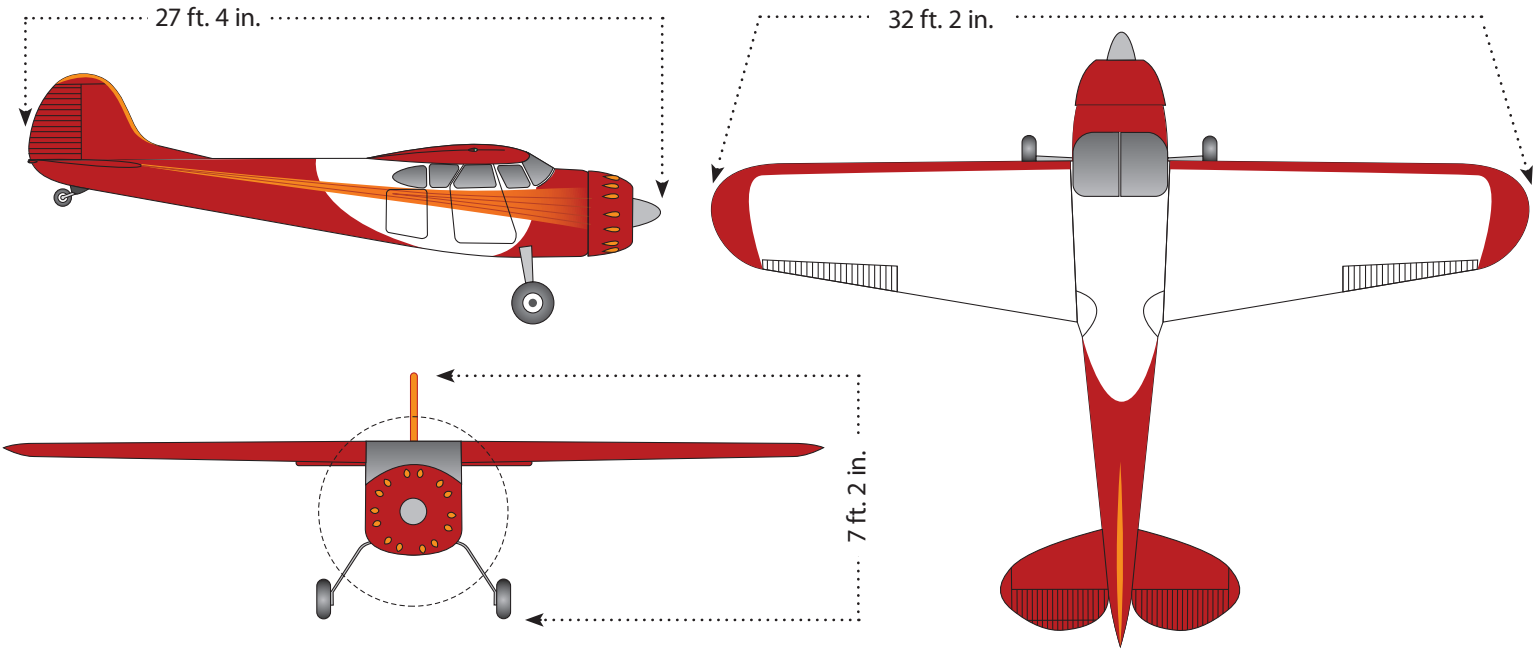
The other significant changes in the airframes over the years were slightly larger flaps along with a modified horizontal tail at serial number 16084. And in 1953, the Goodyear crosswind gear was offered as standard, along with a lighter, springier set of main gear struts.

The crosswind gear casters so the airplane tracks down the centerline in a crab but the wheels remain parallel—more or less—to the runway centerline. It looks odd but works well on those few airplanes that have it.

PERFORMANCE, HANDLING

Owners report that they see between 120 to 140 knots on the various

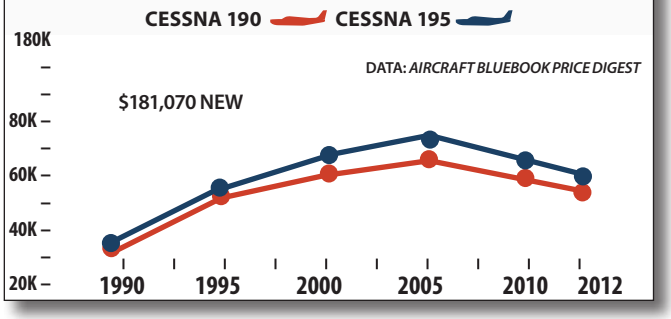
CESSNA 195 BUSINESSLINER



CESSNA 195 BUSINESSLINER MODEL HISTORY

MODEL YEAR	ENGINE	TBO	OVERHAUL	FUEL	USEFUL LOAD	CRUISE	TYPICAL RETAIL
1947-53 CESSNA 190	CONT 240-HP W-670-23	1000	$30,000	80	1250 LBS	135 KTS	$55,000
1947-53 CESSNA 195A	JACOBS 245-HP R-755-9	1200	$30,000	80	1200 LBS	135 KTS	$55,000
1947-53 CESSNA 195	JACOBS 300-HP R-755-A2	1200	$30,000	80	1200 LBS	140 KTS	$56,000
1952-54 CESSNA 195B	JACOBS 275-HP R-755-B2	1200	$30,000	80	1200 LBS	138 KTS	$59,000

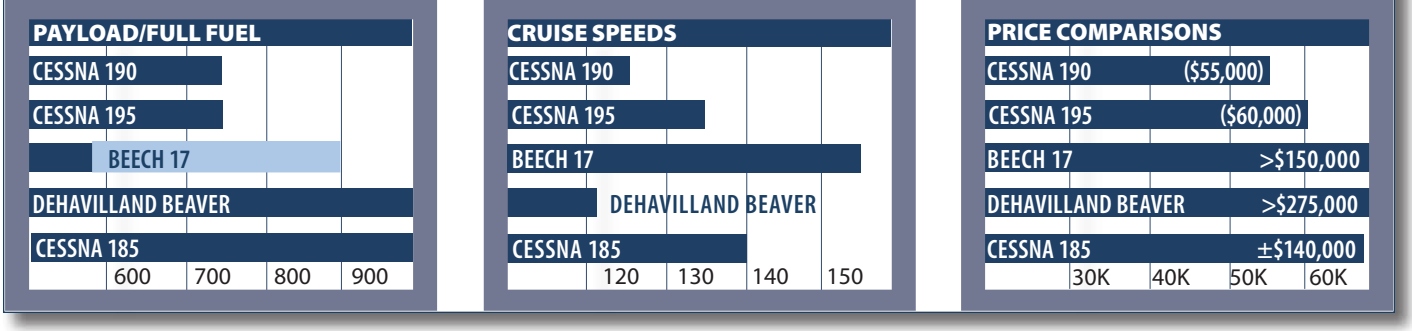
RESALE VALUES



SELECT RECENT ADs

AD 04-21-08	MAGNESIUM AILERON HINGES
AD 84-10-01	BLADDER FUEL CELLS
AD 79-08-03	CIGAR LIGHTER MODS
AD 87-20-03 R2	SEAT TRACK INSPECTION
AD-63-20-02	WING SPAR CARRY THROUGH

SELECT MODEL COMPARISONS



The 195's panel is pure 1950s retro, with old-style metal yokes, piano key switches and no wimpy starter key, but a proper push button.

models with a fuel burn of 12 to 19 GPH. With 76 gallons of usable fuel on board, that means a range of 520 to 780 miles. With the 275-HP Jacobs, count on a cruise of a bit over 130 knots, burning about 13.5 to 14 GPH, at a comfortable and rumbling 1900 to 2000 RPM. Plan on oil consumption of between ½ pint to about 1 quart per hour, depending on engine condition. The ship holds five gallons of oil when it's at full capacity. (Say what you must about round engines, but they love their oil.)

Handling is nothing unusual and certainly any competent taildragger pilot should have no trouble transitioning to a 195. Stalls are Cessna-like, which is to say gentlemanly. Controls are not well harmonized, however, and the 190/195 is definitely a rudder airplane. Remember, the 195 was hatched in the 1940s at a time when designers had not yet coped effectively with adverse yaw.

Although described as an excellent instrument platform and cruise ship, the 195 tends to wander in pitch in a mild, never-ending phugoid. The lack of dihedral causes the airplane to hunt in heading. True hands-off flight is brief indeed, so compared to a modern airframe, the 195 can be a tiring chore to fly for long periods on the gauges.

The visibility from the flight deck is really nothing to brag about, since the big engine blocks the view forward and especially to the pilot's right. S-turns during taxiing are a good idea. In flight, the wing's leading edge is just about at the pilot's eye level, forcing him to lean forward to see around it. As a minor compensation, the windshield's top projects well aft of the pilot's head, as in a Cessna 177, so visibility into a turn is quite good.

There's considerable difference of opinion as to whether three-point landings or wheel landings are best, but everybody agrees that the pilot must keep alert throughout the entire process. Remember that this is a relatively heavy taildragger with the CG well behind the main gear. Allow a swerve of more than 10 or 15 degrees to develop and there isn't enough brake to stop it. A ground loop in this airplane will usually cause major damage to the gearbox, fuselage and wings, perhaps resulting in a total loss. Potential buyers should have a mechanic familiar with the model check the airplane they have in mind for groundloop damage. If it's been repaired correctly, no problem, but if not you could be in for expensive remedial work.

Two types of spring steel gear legs were installed. The later "light" type on the 1953 and 1954 models, was thinner and weighed about 20 pounds less. The earlier gear is much stiffer. Aside from the weight savings, the more flexible light gear may be a little easier on the airframe, especially if a ground loop occurs.

Among the 195 cognoscenti, debate rages on the use of the crosswind wheels. Some experienced pilots say that only fools fly without them. Others maintain that with a little care and experience, a pilot will have no problems with the "straight" gear. The Goodyear castering gear was installed as standard equipment in 1953, but due to poor parts availability, not many of today's aircraft have them. One note: The extra clearance demanded by the swiveling wheels precludes installation of wheel fairings.

PAYLOAD, COMFORT, RANGE

Gross weight of the series is 3350 pounds. A nicely equipped 195 with full IFR avionics and an autopilot will weigh in at 2100 to 2200 pounds, allowing a payload of over a half ton. Roominess is the aircraft's strong suit, with space for four comfortably, or five cozily. This allows full fuel with Mom, Dad, the kids and a week's worth of baggage. Reminds you of Grandpa's old Packard. In cold weather, the 195 offers instant cabin heat, thanks to a Southwind gas heater located under the rear seat, as in modern twins.

For a Cessna, the aircraft has uncharacteristically modest flap power. The split flaps provide no lift, just drag. The airplane is an adequate short-field performer, but falls short of its younger and more capable 180/185 siblings in this area. A set of slightly larger flaps was added with the B

model, along with a shorter-chord horizontal stabilizer and modified trim tabs, but pilots say the bigger flaps don't really affect performance that much.

Along with the old world glamour of the big radial engine comes a healthy dose of fussing—even before you can start the old bird. A lot of the fussing has to do with oil…lots of oil. Since oil collects in the bottom cylinders if the aircraft has been sitting more than a few hours, the pilot must pull the prop through five to 12 blades. This will check for hydraulic lock and allow the start to generate less of a smokescreen.

The pilot is not home-free once he begins taxiing, either, because many of the old radials' oil temps begin to heat up with prolonged ground operation. This is one reason Cessna 195 pilots like to avoid big, busy airports with long rides to and from the active and chances of takeoff delays. Some owners choose to double the cooling capacity by installing a second oil cooler to cope with the problem.

Before shutting the engine down, it's good to pull the prop control to low RPM and allow the engine to idle for a couple of minutes. This gives the engine a chance to scavenge most of the oil that remains inside the crankcase, making a clean start next time at least a possibility. About halfway through this phase, the line man holding your chocks will develop a glazed-over look of boredom or show his impatience while awaiting your shutdown and fuel order.

When the day's flying is complete, it's time to clean up the airplane before tucking it away. That means wipe off the oil, son. While your flying buddies are already tied down and halfway home, you'll still be wiping oil from the belly of your 195. Radials are notorious for leaking—some say that they just have Alpha personalities and are merely marking their territory—and coupled with the old-fashioned wet vacuum pump, there's a fair amount of oil that gets deposited everywhere. It's a labor of love, though, and merely gives you an opportunity to justify a little extra time at the hangar admiring the airplane's beautiful lines.

Although the engines were designed for 80-octane avgas, quite a few owners report they have used autogas with success and STCs are available to make this a legal alternative. Those who use 100LL commonly use a fuel additive such as TCP or Marvel Mystery Oil to reduce lead deposit buildups in these low-compression power plants.

INVESTMENT VALUE, INSURANCE

Inflation and a growing image as a classic have brought the resale value of the 195s to multiples of their prices when new. As with other vintage airplanes, the year of manufacture has little bearing on the selling price. By now, most have been restored, so the quality of the machine and equipment extras are the primary determinants of worth. We perused Websites for *Trade-A-Plane* and *Barnstormer* and saw asking prices between $57,000 and $150,000.

Cessna's idea of luxury was a giant bench seat in the back, comfortable for three, with plenty of leg room. The seaplane door, shown here, is a welcome feature on hot days.

Buyers seem to fit in either of two general mindsets, purists who want nothing less than a showplane restoration to "just as it shipped from the factory" and those who like the lines and nostalgia but want a practical flier.

The combination of a tailwheel and an aging airframe has an impact on insurance costs. We learned that there are fewer underwriters who are enthusiastic about writing policies for 195s than, say, for 180s or 182s. Those who are interested had what seemed to us reasonable PIC and time-in-type requirements.

A private pilot with no instrument rating, 200 hours PIC and 25 hours of tailwheel experience and an extensive checkout would likely see premiums of about $2000 to $3000 a year, assuming a $85,000 hull and $1 million liability. That's about the same as a tailwheel Cessna 180 or roughly one-third more than a 182. Experience and ratings lower insurance premiums, of course.

MAINTENANCE

The new owner will invest a little more effort into keeping the plane flying because Businessliners are rare, and not too many mechanics are familiar with the old radial engines and their archaic accessories. Access to the engine accessories is made easier by an engine mount design that allows the powerplant to be swung out from one side, as on a hinge. The first time an onlooker raises his eyebrows at the unusual sight of the engine being canted about 15 degrees to the left, he's usually mockingly told that "oh yeah, this 195 has the crosswind engine." Cost of annuals are generally comparable to other single-engine aircraft, with FBOs estimating 40 man-hours of labor for the inspections.

Want to work on the Jake's accessory case? In the days when engineers thought about maintenance, Cessna built in a swing-out mount that makes it easy, above. If you simply can't slum around on 275 HP, there's always the 450-HP Pratt R985 conversion, below. It's called the 196 and although there aren't many out there, the airplane's performance is impressive.

One common problem with the 195s is a leaking oleo tail strut. Generally, a good overhaul with proper seals will correct this, but some believe servicing it with Granville Strut Seal might be the answer.

Insofar as ADs go, there aren't many, considering the 60-plus-year age of the airplane. Only four require recurrent inspections. There are no ADs on the engine or propeller, something that strikes us as a record of sorts. All the Jacobs and the Continental engines go about 1000 to 1200 hours to TBO.

An overhaul will cost around $31,000 give or take. Given the shorter TBO and appetite for oil and gas, there's no question a round engine is more expensive to operate than a conventional flat aircraft engine, but they're still affordable for most owners.

PARTS, SUPPORT

Despite the fact that these days Cessna provides little more than moral support, owners report that the parts situation isn't too bad. In addition to some parts being available from Cessna (albeit pricey), The 195 Factory, LLC (service@the195factory.com) can provide most airframe parts from new manufacture. Brown Aviation Products, Inc. (ce195@earthlink.net) stocks many parts. Heritage Aero (roundengine@sbcglobal.net) has many spares for the straight and crosswind Goodyear wheels and brakes. Barron Aviation (barron@nemonet.com) manufactures an approved and improved inboard aileron hinge which can eliminate a recurring AD check.

You might not be well served by taking your Businessliner to the local Cessna boutique for service—you could find yourself paying for the learning time of the technicians. Recently the International Cessna 195 Club (www.cessna195.org) has begun hosting owners' maintenance forums at strategic locations across the U.S. to improve the awareness of the airplane's special needs. The program offers an opportunity to spend time with "195 professionals" who provide hands-on insight by accompanying the owner and his mechanic in inspecting the few areas that are unique to the type.

Several 195 specialty shops have arisen to cater specifically to the marque. In the northeastern U.S., The 195 Factory provides inspections and repairs. In the Midwest, there are two shops recommended by owners: Barron Aviation and Butterfly Aviation (butterfly@st-tel.net). In the West, Sonoma Aero and Heritage Aero have been given accolades.

Radial Engines, Ltd. (www.radialengines.com/main.asp) overhauls Jacobs and Continental Radials. Air Repair, Inc. (www.airrepairinc.com) is the type certificate holder for the Jacobs engines and provides repairs and parts for them and the Continentals, too. Air Repair has modernized the Jacobs engines in many areas, mostly aimed at improving the oil burn and oil leakiness of the engines. Recently overhauled Jakes are alleged to rival flat engines in their oil use.

Some parts for the Continentals are scarce, although rebuilders can make do with used, serviceable parts. The R755 Jacobs are well supported with many new and modernized parts available. The R915 330-HP Jake is not an orphan, but not nearly as well supported as its smaller sibling.

MODIFICATIONS, CLUBS

For safety, retrofitting retractable shoulder harnesses (B.A.S. and others) improves survivability in the event of

The 195's unique crosswind gear, above, castors to allow the airplane to point off the flight track.

an accident. And the lap belt's attachment point is relocated from the seat frame to the floor where it can actually do some good.

There's a popular locking tailwheel (The 195 Factory, LLC) which many feel tames the beast's ground handling. Hartwig Fuel Systems (formerly Monarch) makes a replacement fuel filler cap that's designed to repel water and also has individual venting. It's STC'd for most Cessnas, but not specifically for the 195, so a field approval will be needed.

Although the Lear L2 was the factory-optional autopilot, we note that Brittain has an STC for its B2C system and S-TEC for their series 30 and 55 systems. (Lots of luck getting repairs on the Lear, by the way.) Any of these do an adequate job, but we were not able to identify any maker who has certified a yaw-damper. This would be a welcome addition due to the aircraft's considerable adverse yaw characteristics.

Judging from the comments of owners, one of the most useful conversions is from the troublesome Goodyear brakes to Cleveland brakes, which are many times more effective. For increased convenience, the addition of tail push handles help move the airplane on the ramp (B.A.S., Inc.). Jasco makes a 50-amp alternator conversion kit to replace the old and heavy 35- or 50-amp generator.

Though an improvement, the alternator's relatively limited power output is marginal for today's equipment-giddy panels. (B.A.S. is at www.basinc-aeromod.com and Jasco can be accessed through www.skytronicsinc.com.)

Avionics upgrades for the 195 can be a challenge. The huge oil tank lives behind the instrument panel, thus requiring radios of short depth and the engine's noisy ignition system was designed in 1934 when radios weren't even on the engineers' scratch pads. A significant tab can result from the avionics shop's chasing of the elusive electrical noise source.

Radial Engines, Ltd. has been issued a STC for a fuel-injection mod for the Jacobs 275- and 300-HP engines that reduces fuel consumption and evens out fuel mixtures to the cylinders for smoother operation and greater power. The engine originally had only an oil screen. Many have been retrofitted with oil filters from ADC, Air Wolf or other field STC sources. (Airwolf's site is at www.airwolf.com while ADC can be accessed through www.aviationdevelopment.com.)

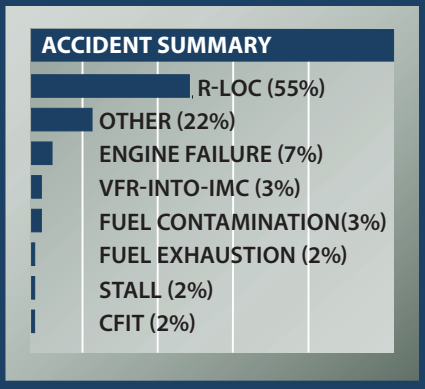
In addition to the Jacobs and Continental engines that Cessna installed on the planes at the factory, the years have witnessed STCs for a few other engines. Perhaps the most common is the Jacobs R755's big brother, the L-6. It provides 330 HP for takeoff. In the 1960s, Page Aircraft Engines adapted a turbocharger, resulting in the R755S; it's rated at 350 HP for takeoff/300 HP continuous. Western owners praise the performance improvements for mountain flying. The King Kong of all Cessna 195s resulted from Parks Aviation installing a Pratt & Whitney R985

ACCIDENT SCAN : GROUNDLOOPS

The last time we swept the Cessna 190/195 accident record, we found that the type suffers a boringly predictable pattern. In the seven years since we last looked, nothing has changed.

The Cessna 190/195, being among the heavier taildraggers that any GA pilot is likely to fly, suffer an inordinately high incidence of groundloop and R-LOC. And these aren't just garden-variety excursions, but full up spin-the-thing or nose-it-over events that cause significant damage. (Benign groundloops don't turn up in the NTSB database.)

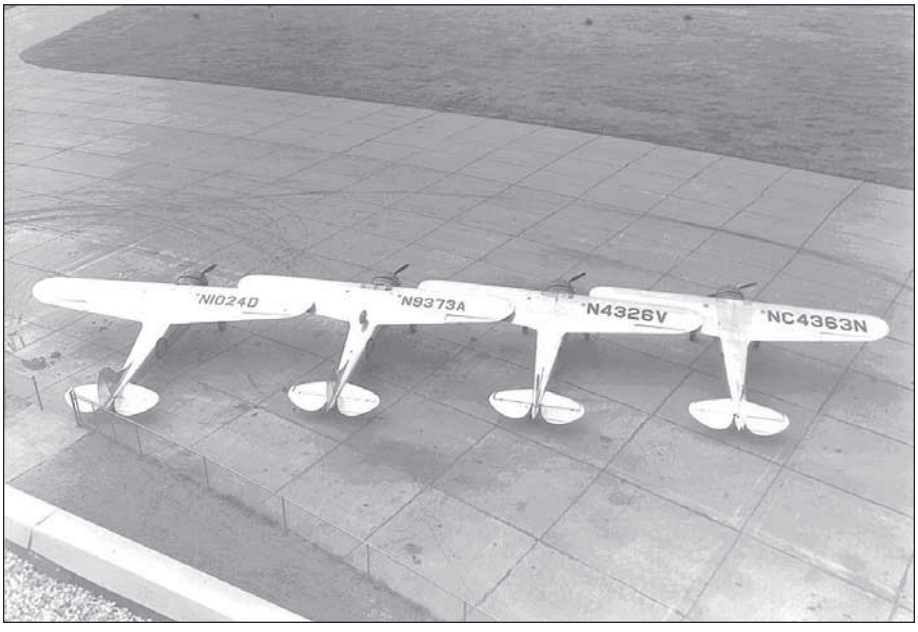
Interestingly, among the myriad reasons for groundlooping, we found one we've never seen before: The wheels fell off, literally. Several accident reports indicated that groundloops occurred after axles or wheel assemblies departed the airplane upon touchdown. In a couple, a landing gear leg broke and in at least four, there were issues with brake failures or tailwheel control problems. Obviously, given the airplane's age, maintenance plays a critical role in safety, especially with regard to landing gear.



with a whopping 450 HP to improve the climb and high altitude characteristics for aerial photography. There was only a handful of the latter planes built by Parks—they carry the model designation of "196" after the mod—most have tip tanks to accommodate the higher fuel flow but at least one has higher capacity tanks installed in the wings to provide 100 gallons of useable fuel.

The original 10.00 SC smooth-contour tailwheel tire and tube is available, albeit expensive. Some owners have converted to a tailwheel that uses the same tires as a Cessna 180, a much cheaper alternative. They're available from R-R-R-Russ Aircraft Supply. (See www.russaircraft.com.)

The aforementioned International 195 Club has a broad membership and hosts annual fly-ins at various locations in the U.S. Its Web site has a hangar talk bulletin board where information is shared and the club publishes a quarterly bulletin for members. It has many technical materials and support information.



The 190 series first appeared in 1947, left, and was made only until 1954, soon to be displaced by thousands of Skyhawks.

READER FEEDBACK

When I started looking for a 195 back in 1991, I struck up a conversation with a few old guys and said what I was thinking of. One of them replied, "Whaddya wanna do that for? You can get a Warrior for about the same money!" He was right, I could get an IFR-capable Warrior that was 20 knots slower and carried several hundred pounds less and had almost no ramp appeal. Or I could get a 195 that carries whatever you can squeeze in the door—and that's a lot—and cruise at 134 knots at 8000 feet on 11.5 GPH.

Another plus is that when you pull into the ramp, you're practically a celebrity skygod. Having grown up in taildraggers, I hardly give a thought to ground handling of the 195, but I'd recommend that new owners be proficient in a Cessna 140/170 or Citabria before they strap on the 195. It's not a must and several people I know have started from scratch in them, but most will find the transition from a lighter taildragger a little easier.

I've checked out several new owners over the past dozen years and once they get used to the sight picture of looking around the curved cowl, they do well. The biggest problem seems to be the visibility while taxiing. Anything at 12 to 2 o'clock cannot be seen unless the pilot S-turns or really stretches across the cockpit to see. If you get lazy and assume there's nothing there, there will be! I know people who've been surprised by and subsequently collided with runway lights, gas trucks and ultralights. I had a close encounter with a fire hydrant, which I missed by a few lucky inches.

None of these close encounters were the result of a loss of directional control; they were simply cases of temporarily stowing the on-board computer in the rectal storage area. The 195 is a delight to fly—kinda like a single-engine DC-3—and it looks and sounds cool. But make no mistake, the 195 is still a functional

Round-engine drivers need a tool set worthy of the class, including spare plugs and something to catch oil drips.

classic aircraft. You just need to pay a little more attention when you're on the ground than most modern era pilots are accustomed to doing.

Scott Hartwig
Belvidere, Illinois

I've owned my Cessna 195 for over 18 years and have flown it nearly 1500 hours. It came with a 245-HP Jake that was very tired. I upgraded to the 275 HP. Wow, what a difference! It really made it into an energetic get-things-done machine.

I use it for family transportation, often IFR. It does just fine, with an occasional query from ATC: "What type of Cessna is that? I'm not familiar." I tell them to pretend it's a 206 because that's a close comparison. That is until I get the preferred parking place on the ramp so passers-by can admire my Businessliner.

With its big, round engine with the blisters on the cowling and the spinner meeting you eye to eye, I thought, "man, this thing's huge" the first time I met the airplane. Climbing up into the cabin using the retractable step and walking up the aisle between the seats to the "flight deck" … well, that's class.

At first, it was so blind on the ground that I felt like I was operating a steam locomotive. However, I learned how to compensate, like driving a panel van with no windows. I conditioned myself to look before I turned into the blind spots.

Any gathering will sooner or later spur the topic of three-point vs. wheel landings. I do both, but prefer wheelies on pavement and three-pointers on turf. I get smooth landings more often when I wheel it on and I feel like I can protect the tailwheel strut a little better.

Over the years, the 195s have elevated in status from the old derelicts that were forgotten behind the hangars to prized possessions. In former times, many were subjected to shoddy maintenance and makeshift repairs, so caveat emptor. These days owners seem to be restoring them to their rightful stations as one of the true classics from a bygone era.

My dispatch reliability is about the same as modern Cessnas, which is to say pretty good. It doesn't break very often. But when it does, I'll have some hassles in finding a shop to cater to the vintage systems and parts. The type clubs and other owners have been supportive, and now there are several shops who really know 195s, so it's much easier than it was two decades ago.

The 195 is a solid performer that has the added attraction of uniqueness. To my eye, at least, it's one of the prettiest airplanes ever made, yet is still pretty affordable. So, if you can tolerate the extra challenges of managing an old airplane with a radial engine and a tailwheel, and if you can cope with the small groups of people that inevitably gather around the airplane on the ramp with ooohs, ahhhs and questions, I'd say go for it and get a 195.

Coyle Schwab
St. Charles, Illinois

I put over 1000 hours on my 240-HP Continental-powered 190 which, other than not having a 275- or 300-HP Jake, is identical to the 195. One winter night the visibility inside was hindered when a can of oil in the baggage compartment got stuck near the gas heater under the rear seat. Heat caused expansion of the container and vaporized the oil. I turned off the master and rolled down the window on the pilot's side (yeah, it has a roll-down window; neat!) venting the interior.

The tail strut was perhaps the most awful-to-maintain thing on these machines. It was common for owners to put a spring inside the shock as the Cessna gas-filled tail shock was difficult to maintain.

These airplanes are a pure pleasure to fly. Big. Massive. Comfortable. Three people can sit in comfort across the back seat. You get in the aft door and walk up between the two pilot's chairs and sit in comfort. Turn the prop through a few blades to make sure there is no oil down in the bottom jugs and then bring the engine to life.

Yeah, that big engine does hide an easy view in some directions, but you learn how to handle it. And in cruise, the slow-turning engine just does its job in a fashion only found in these fine machines. Crosswind landings? Some have castering main gear, which is a treat. Mine did not and I learned to smack it down wing low on the tail and upwind gear.

These are the last of the very-expensive-to-build airplanes. It's a classic, very comfortable machine. My kids called it the "great iron bird."

Art Brothers
Salt Lake City, Utah

The Aviation Consumer

Gippsland Airvan

(continued from page 7)

wheel, saving a little weight. Even at a weight about 300 pounds below gross, the airplane rotates and lifts off easily at about 60 knots indicated and into a climb rate of about 1200 feet a minute which, according to the POH, it should maintain into the low teens. The engine is rated to its full 320 HP to 5000 feet, then 300 HP to its critical altitude of 14,000 feet. The GA8 is, however, not a fast airplane, despite the turbocharger. Dragging it into the stratosphere won't help. We noted about 125 knots on 14.5 GPH at 4000 feet. Morgan said with careful trimming and patience, 130 knots is doable. So clearly, this airplane is for hauling people and stuff, neither of which will get there fast.

Slow-speed handling is simply superb, the result of a Part 23 airplane taken to its highest and latest level. Trim stability is exceptional, thanks to the forward-mounted wing, large stabilizer and huge elevator. Gippsland worked extensively with the National Test Pilot School in Mojave and it shows. The airplane vsimply settles down to the commanded airspeed and stays here. A dinner-plate size trim wheel on the center console makes minute—and major—trim changes a fingertip thing. What a refreshing change from the chintzy electric trim we've become accustomed to in LSAs as a weight-saving measure.

So confidence-inspiring is the GA8 handling that we did something we normally wouldn't: aggressive slow flight and aggravated stalls with passengers in the back. (They were agreeable.) This the Airvan handled without complaint, especially the aggravated stalls, which it seemed to shrug off, bobbing the nose a couple of times before resuming the GA8 version of parachute mode. Altitude loss was minimal. There's no pitch change with the application of the first notch of flaps and only slight pitch up with full flaps, requiring very little trimming.

With stalls behind us, we did another thing we wouldn't normally do: Take a heavy airplane with five people aboard into a 2000-foot grass strip with obstructions. Yet we did exactly that, with performance to spare. Morgan recommended a 70-knot approach speed with full flaps and the GA8 had no trouble stopping in less than half the length of the runway, even without braking.

Unloading three passengers, we tried a couple of more, for which Morgan suggested a 60-knot approach speed. Trimmed to this speed, the Airvan simply nails it, leaving the pilot to make glidepath adjustments with minor power changes. These affect neither pitch nor airspeed. With hard braking, the airplane stopped in under 400 feet.

CONCLUSION

We're not often impressed by airplanes merely for their handling traits and even at that, we wouldn't expect a boxy cargo hauler to be the airplane doing the impressing. But that's definitely the case with the GA8 Airvan. At every turn, the airplane seems well built and well engineered, with the only clunker we could find being the aforementioned overhead panel.

In our view, the Airvan is well designed for its intended market and the company seems to have responded to the things that cargo and back-country operators say they really want.

Although at $800,000, it might not find much market among private owners, for an operator who needs a revenue-generating working airplane, the Airvan looks good to us. It bests Cessna's 206 in both payload and pilot friendliness and is a far better handling airplane, in our estimation.

Unfortunately, its high price may limit its appeal to a market like Alaska, where Beavers, 206s and Cessna 185s still carry the day (and the load). But eventually, some of those airplanes will have to be replaced and the GA8 will be the right choice for operators who can make the numbers work.

FEEDBACK WANTED

CITABRIA/ DECATHLON

For the June 2012 issue of *Aviation Consumer*, our Used Aircraft Guide will be on the Citabria/Decathlon, an aerobatic taildragger that evolved from the Champion line. We want to know what it's like to own these sporty airplanes, how much they cost to operate, maintain and insure and what they're like to fly. If you'd like your airplane to appear in the magazine, send us any photographs you'd care to share. We accept digital photos e-mailed to the address below. We welcome information on mods, support organizations or any other pertinent comments. Please send correspondence on the Citabria/Decathlon by April 1, 2012, to:

Aviation Consumer
e-mail at:
avconsumer@comcast.net