April 2011
Volume XLI
Number 4

The consumer resource for pilots and aircraft owners

The Aviation Consumer®

Garmin's New GTNs

We know ya well enough 430/530… page 4

Oil supplements … page 9

Which is better, A or B? … page 17

Italian import … page 21

9 OIL SUPPLEMENTS
Maybe not must haves, but a hedge against rust

12 FUEL SURVEY
Owners like 100 octane as a choice, but not 94UL

16 SON OF ZULU
Not night and day, but it's clearer and quieter for sure

17 PROGRESSIVES FOR PILOTS
Picking the right lens

21 TECNAM P2008
No-apologies high-end LSA with performance to match

24 CESSNA 182 RG
Folding the gear is good for 15 knots over the straight leg

The Aviation Consumer

EDITOR
Paul Bertorelli

MANAGING EDITOR
Jeff Van West

CONTRIBUTING EDITORS
Jonathan Doolittle
Rick Durden
Larry Anglisano

SUBSCRIPTION DEPARTMENT
P.O. Box 420235
Palm Coast, FL 34142-0235
800-829-9081
www.aviationconsumer.com/cs

FOR CANADA
Subscription Services
Box 7820 STN Main
London, ON 5W1
Canada

Back Issues, Used Aircraft Guides
203-857-3100

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, Box 420234, Palm Coast, Fl 32142. In Canada, P.O. Box 39 Norwich, ON NOJ1PO, Canada. Publishing Agreement Number #40016479

I'm Sorry, Dave. I'm Afraid I Can't Do That

Remember that classic line from *2001: A Space Odyssey?* That's the first thing I thought of when one of Garmin's engineers was demonstrating the voice recognition function in the new GMA35/GTN series we're covering in this issue. I could imagine myself getting into an argument with my semi-intelligent audio panel: "Listen, you pile of transitorized crap, I said switch to comm 1! And my name's not Dave!"

"I'm sorry you're upset, Dave, but I don't understand your command." It's all good fun…till the thing does something you don't want it to.

Not that I'm suggesting that voice recognition won't work or isn't a good idea. Field experience will confirm either or both. For the big-picture folks among us, the larger question is what does this kind of automation do for the operation of a light aircraft or the flight experience itself? The reason to ask this is that where this is eventually going is voice control for more functions in the airplane, from basic control setting to comm management to emergency procedures. It's easy to see the potential.

But what does it *do* for you? This brings to mind another movie: *Wall-E.* That's the one where robotics have so insinuated themselves into the functions of everyday life that humans have been reduced to pudgy, poorly toned organic blobs that traverse the physical world in bins propelled by conveyor belts. The conveyors are overseen by…robots.

Voice actuation gets down to two things: How you engage with the physical world and whether you're a talker or a tool user. Do you prefer texting/instant messaging or would you rather pick up the phone? (I do both and tilt either way, depending on the task at hand.)

To me, the test-for-success is whether such innovations erect or remove the natural barriers between your desires and letting the machines you operate *know* your desires. Ideally, you should be able to *think* it and have it done. The voice recognition in the new Garmin products doesn't do that, but it gets a step closer to doing that. Theoretically, like a fighter pilot processing data through a HUD and tickling the piccolo on a HOTAS, you can keep your eyes outside the cockpit while changing frequencies or performing other tasks that would otherwise require heads-down time. You improve your information uptake and raise the threshold for overload.

Whether this is good or bad depends on whether manual manipulation of a knob or key is part of the *way* you think, a necessary bit of tedious connection you consider important to being engaged with the machine. Another analogy is dictation versus typing. I absolutely cannot dictate; I have to type to think through what I want to say. It's just part of my cognitive process, limited and flawed though it may be. (I also hate automatic transmissions; give me a five speed, please. It has to do with engagement.)

On the other hand, I despise knob twirling, especially for frequency changes or—the worst—scrolling in a flightplan. At the least, the GTNs remove this barrier and reduce the tedium. Its improvements are not just happy to glad.

But as for the voice recognition, this is why I think the GTNs represent a subtle, incremental technical step forward, but what could be a rather larger ergonomic step forward. I think it's 60/40 on whether pilots will adapt or find the thing is just a software writer's parlor trick, with the 60 percent on the plus side. Either way, Garmin has launched an interesting experiment.

—*Paul Bertorelli*

HEADSET BLOWBACK

Your review of in-the-ear headsets was interesting, but you might want to give a little more space to custom eartips. I bought my Lightspeed Mach 1 with custom eartips as an integrated package, which includes a negotiated, reduced fee for the audiologist and saves a little cash. But either way, it's well worth it.

With custom earmolds, the Mach 1 is so comfortable I can't feel its presence on my head or in my ears. It also stays in place much more securely than with foam tips, so well that I removed the over-the-ear clip from the left earpiece/mic unit and it still doesn't budge. And, contrary to your quote from the competition, although the low-frequency attenuation isn't as good as the best ANR earcups, the high-frequency noise reduction is as good as the best head-crushing vise I've worn.

The Mach 1 with custom eartips still costs less than a Zulu, and way less than a Bose A20. For airplanes with big, loud piston engines and big, loud propellers, earcup ANR is still the best bet. But for high-frequency wind or canopy noise and absolute comfort, the Mach 1 with custom earmolds is the best I've experienced.

Steve Leonard
Via e-mail

I've been using Lightspeed headsets of one form or another for over 10 years now. I went to the molds when they stopped stocking their largest foam earplugs. With the custom ear mold plugs, the mike stays in place and there's no need for the over-the-ear hanger.

You're left with two earplugs, wires and the interface box. Can't say how long the battery lasts in the controller, but mine is still going strong after two years. My wife prefers quiet to read when we fly and I prefer a little music. Plugging into the Lightspeed controller provides the perfect solution.

Alan Williams
Via e-mail

CO Detectors

Thanks for the kick in the pants to re-evaluate my SafeTest 90 that

your article on carbon monoxide detectors in the February issue provided. I have had the Quest SafeTest 90 since a near-death experience in my Tiger 12 years ago.

I bought the SafeTest for $250 from Sporty's the next day. Since I have no OSHA requirements, I never had it tested or recalibrated, but it would occasionally give low CO readings when I taxied with the canopy open and so I was satisfied that I was covered.

After reading your article, I did an informal test of the SafeTest against a top-end CO detector I have in my house and I was satisfied that the SafeTest 90 needed recalibration and probably a new sensor. A quick call to the Quest technicians at 3M confirmed both these conclusions.

But I was quoted a price for the calibration check and a sensor which was well north of the new price of the BW Detectors you described in the February article. The information I got from BW was slightly in variance from the information in the article. The 24-month clip was $200, but the $240 option they have is for the 36-month disposable and the Gas Alert Extreme was $265.

They claim to have no intention of selling these through Aircraft Spruce and in fact do not sell them direct to users, either. I had to order it through a local distributor which also added $20 in sales tax. No real difference than paying shipping from Aircraft Spruce, but I would rather support the boys in Memphis or Louisville than the band of criminals who run our city and state, but that's just me.

I just picked up the Gas Alert Extreme today and think I'll really like it. It fits in the receptacle I built for the Quest unit in my cockpit and the distributors here in Albuquerque can calibrate and replace the sensor locally for about one-third the price (and without any shipping delay or expense) that 3M will do the SafeTest. It also has all the same functions as the SafeTest 90.

I agree with you, the SafeTest 90 is a premier piece of equipment, but the pricing imposed by 3M and the discontinuance of production are both strong indicators that they aren't interested in serving the market any longer. Take good care of the Safe Test 90 you have.

Brent Smith
Via e-mail

Cirrus Accidents

I have been an *Aviation Consumer* subscriber for over seven years and I'm writing for the first time to express how disappointed I am in your Used Aircraft Guide on the Cirrus

continued on page 31

CONTACT US

Editorial Office
941-929-1693
E-mail: avconsumer@comcast.net

Subscription Department
P.O. Box 420235
Palm Coast, FL 32142-0235
800-829-9081

Online Customer Service:
www.aviationconsumer.com/cs

Back Issues,
Used Aircraft Guides:
203-857-3100
E-mail: customer_service@belvoir.com

For weekly aviation news updates, see www.avweb.com

Garmin's New GTNs: Bigger, Faster, Better

The long-awaited replacements for the GNS series aren't revolutionary, but easy logic, larger and sharper screens and remote integration make them a hit.

by Paul Bertorelli

We knew it had to be coming, we just didn't know when. The "it," of course, is the long-awaited follow-on product to Garmin's hugely successful GNS430/530 series navigators, of which there are some 120,000-plus in the field. The new boxes are called the GTN650 and 750 and Garmin took the wraps off these at the Aircraft Electronics Show in Reno in late March. It gave us an advance view and flight trial ahead of the show. First impression? These products will evolutionize the market with a short list of advanced features, they will likely ignite an intense secondary market in used GNS430/530 products and as the world moves smartly toward self-contained EFIS, these may very well be the last products of their kind.

AVIONICS FLIGHT TRIAL

The GTN series could be described as a hybrid of everything Garmin has learned from developing related products, including the yet-to-be-released G3000/5000 series, the aera portables and the stripped-down operating logic the company has adhered to since it launched its first GPS 21 years ago.

The new navigators are heavily touchscreen and menu driven, they have larger improved displays, they'll interface with anything, they will eventually include voice recognition capability and pricewise, they actually come into the market a bit cheaper than their predecessors did, when indexed to inflation. The smaller GTN650 retails for $11,495 while the GTN750 retails for $16,995.

Following the trend in consumer electronics, they do quite a bit more at the same or a slightly lower price. They do not, however, represent the great leap forward that the original GNS430 did, but rather a large incremental advance.

THE HARDWARE

In the 13 years since the GNS430 appeared—yes, 13 years—display, processor and GPS technology has all but reinvented itself and the new GTN boxes integrate those advances. They use a variant of the 5 Hz WAAS chip Garmin developed for the GNS430W/530W, but both the

CHECKLIST

- ⊕ Larger, sharper screens make the GNS430/530 look pale.
- ⊕ Touchscreen logic is well designed and easy to use. No POH required.
- ⊕ Indexed to inflation, prices are actually cheaper than the 430/530 intros.
- ⊖ If we've got to carp about something, it's this: No slide-in replacement for 430/530.

GTN650 and 750 have new, faster processors with more video capability. The displays remain the TFT technology that's now industry standard, but the resolution is higher. On the 650, it's 600 by 266 pixels while the 750 has 600 by 708 pixels. That's about a five-fold increase in pixel density. Both screens have 250,000-plus colors, the net effect of which is to render details such as terrain and weather in near-VGA crispness. Where the GNS530 goes blocky at the mid-range scales, the GTNs don't, although they do exhibit some refresh delay. Both of the new products support Garmin's 9-arc second terrain capability. Side-by-side with the G600 EFIS, they're not quite as photo-realistic, but the difference is subtle. Speaking of which, the G600 supports synthetic vision and we asked if the GTN 750 could. Garmin's Jim Alpiser says that's unknown, so we'll take that as a maybe. Our impression is that it has a lot of hooks for future development, even if it doesn't evolve into some kind of EFIS crossover mutant.

Sizewise, the displays are larger, although this is most noticeable when you look at the previous generation after using the GTNs. The 650's display is 53 percent larger on the same size overall box, while the 750 is an astonishing 98 percent larger in a unit whose display is 6 inches high compared to 4 inches for the GNS530. (The box itself is not as high as the display, providing space behind the display for a remote audio panel, thus freeing up panel space.)

Garmin gets kudos for not cluttering up these displays with a bunch of extraneous data and it deserves more credit for using them to maximize the size of the menu icons and buttons, something that the presbyopic crowd who can afford to buy these things will appreci-

The size of progress, right. The GTN750 and 650, left, provide more capability than the GNS430/530 right, plus the audio panel, which can be incorporated into the new GTN750.

Image above illustrates how Garmin squeezed more screen real estate out of the same size box. GTN650, above, is 53 percent larger than the GNS430, below. Elimination of 12 of the 430's 16 keys and knobs helped. Most functions begin with the hard home key in upper right.

ate. They're sort of the *Reader's Digest* large-print version of navigators.

If you were hoping these boxes might be pin-for-pin slide-in replacements for the 430 and 530, it's not to be. They require their own dedicated trays, so installation will be a full-boat deal. However, you can retain the standard Garmin GMA35 antenna, since the new products will use these, too.

The most striking thing about the GTNs is how Garmin got the displays that large. They essentially shrunk the bezels down to the bare minimum by stripping the keys and reverting to a touch-screen driven operating system. Where the GNS430 has 16 buttons and knobs—18 if you count the concentric—the GTN650 has…four, one of which is a concentric. For a veteran 430 owner, this will be disconcerting at first. How the hell do you make this thing play? You need to know just one thing: Push the home key.

The entire operating system—almost—drives through the home key which, when pushed, pulls up a series of icons that paint a graphic interface glimpse into the boxes' inner functions. Some of these step through to additional sub-choices. The only familiar dedicated key remaining is the direct-to key, a decision Garmin made because it knows that some user's overarching knowledge of sophisticated GPS navigators consists entirely of jabbing the direct-to key. The rest of the functions lie unexposed to the light of intelligent life.

Will the menu-driven approach help that? If it doesn't, Garmin should add a feature to check the operator for a pulse. (Maybe a future software upgrade?) We weren't able to do a function-by-function comparison of the GTNx's operating logic with the GNS series, but from what we did see, it's an amalgam of the aera GUI-driven logic with vestiges of Garmin's familiar operating system. For example, punching the direct-to key pulls up a screen populated by a waypoint subpage or list, just as with the 430/530.

At this point, you can either scroll in the waypoint you want with the concentric knob, which is soooo 1998, or touch the "select waypoint" icon and pull up a virtual keyboard to punch it in directly. Want to guess which is easier? On the 750, the key icons are large and you really have to be fat-fingered to miss a key. There's no haptic or reiterative feedback, but the touchscreen uses capacitance sensing so its sensitivity is a little less (better) than a crappy smartphone, but not the touch-me-twice-please tendency of the resistance-based aera touchscreens.

On the 650, the overall screen size isn't large enough to accommodate a full A-Z touchpad, so the navigator displays the alphanumerics horizontally in a tape format, which you can finger slide to find the letters or—faster—pick a five-letter zone of desired letters from a compressed A-Z tape below the main tape slider. We didn't have enough time to compare the two keyboards in depth, but either is a vast improvement over knob scrolling. Also worth mentioning is that you can finger pan or scroll the screen at any time.

At this juncture, you're thinking… what about turbulence? How you gonna punch those keys in continuous moderate chop? Garmin thought of that and has molded raised lips into the sides of the bezels and a finger rail at the bottom. These serve as anchor points for your fingers or a thumb or whatever digit isn't doing the key punching. On our flight trial, we encountered some bumps at low altitude and tried this out. It seems to work, but it's an acquired skill and Garmin test flight engineer Grant Wintenborn told us everyone does it differently.

For example, with your ring finger on the right bezel and your thumb on the left, you can peck away with your forefinger, but when you want to hit the back key in the extreme

AC TV

For two videos on the GTN series, log on to www.avweb.com and select the video index. Then scroll down to the GTN navigator review videos, part of AVweb's Aircraft Electronics Association show coverage.

lower left of the screen, now what? Your thumb, that's what. First time, it takes a little hesitation to figure this out; second time, it's more natural. Wider field experience will reveal the prehensile limits of the contemporary pilot. We'll be standing by to see how users take to this.

And speaking of the back key, it brings the GUI logic you know from Web browsing into a cockpit navigator. By now, jabbing a back key when you screw something up is almost an autonomic function for the fully evolved man. So it is with the GTNx's. When you get used to the back key being lower left rather than upper left, backing out of miscommands is second nature.

INTEGRATION

The reason the back key isn't upper left is because the comm controls are up there on the GTN750. As it did with the 430/530, Garmin has integrated the comm control/display into the main display and without mincing words here, it works way the hell better in the GTNs than it does in the G1000. Comm control is utterly intuitive and there are some nice add-on details.

The comm freqs appear on the top of the display on the 750, on the right on the 650, with the active frequency on top and standby on the bottom. To flip them, just touch the standby window and the two exchange position. Or you can punch the center concentric knob. To key in a freq, touch the standby window and you get a giant numeric keyboard to punch in the frequency you want.

Once you've done that, the frequency will be in the standby window. At the bottom of the screen, is the choice of "monitor" or "xfer." The former allows you to monitor the frequency while having the other active while xfer immediately activates the frequency you just punched in. You can scroll the frequencies in using the inner knob—familiar, but slow.

Where the design inches into the pretty cool is the find function. Like the Mac's Searchlight, punching the little magnifying glass symbol allows you to search for waypoints by type—recently used, VORs, name, by city and so forth. This function isn't new, but it works better than the previous variant did.

Integrated functions for the transponder and audio panel are similarly in the Goldilocks zone—just deep enough to be genuinely useful and practical, but not too far out there as to pass into the look-how-%$#@-clever-I-am-navel-gazing realm of software features. The audio panel and intercom functions are especially well designed, offering an easy-to-figure-out capability to split mics, external inputs such as music, volume control via finger sliders and a built-in clearance recorder via the audio panel function. The GTN750 is designed to work with a new remote audio panel coming this year called the GMA35, but it will obviously tie into older audio panels, albeit without the integrated control through the navigator. The 650 doesn't have the remote audio capability.

What's most intriguing here is that the audio panel will have voice recognition capability for basic commands and although Garmin didn't say as much, the navigator itself seems certain to eventually get that capability, too. (See sidebar above.)

FLIGHT PLANS, CHARTS

Garmin has significantly improved the flight planning and charting functions in the GTN boxes. As with everything else, you enter the FP function through an icon on the homepage and the logic steps you through the options to add each waypoint, popping up the keyboard in context as required. The search func-

TALK TO THE HAND AUDIO PANEL

Voice actuation or speech recognition has been an on-and-off again proposition in the computer field. Software to do it has been out there for a few years and it generally gets mixed reviews. Now it's Garmin's turn. One of the intriguing features of the GTN series is a new remote audio panel that will accept voice commands for a range of functions. (GTN750 only.) It's designed to work through the 750's integrated audio control function and is small enough to live in its own rack right behind the box's L-shaped backstage area. (A bezel version of the audio panel will also be available, the GMA350, above.)

These basically build on the capabilities of the GMA340, but add some additional features. The voice recognition expands on what Garmin has been offering in its consumer-grade ground navigators and it allows things like switching comms, controlling inputs and outputs and the like. We saw a brief demonstration in a bench workup model and it seemed to work well. It does require an additional momentary button on the yoke since you obviously need a dedicated open circuit to the audio panel, lest it run amok while listening to routine intercom chatter. (Funny, I don't remember muting all the comms…)

It's easy to see that this is the first baby step toward voice recognition for navigation functions, not to mention the rest of the airplane, which could be a good thing. Or not.

The GMA35/350 adds another intriguing feature called 3D audio. Garmin says this gives the audio the "cocktail party effect," and they don't mean that drunken stooge of a neighbor you invited. What 3D audio does is to phase/time shift mixed audio inputs so the ATIS recording sounds like it's 30 degrees to your left, while approach is 30 degrees to your right. A gimmick? Maybe, but Garmin gave us a demo and it really does work, helping you sort out the audio clutter while listening to two sources. We're not sure how practical this will be until it gets into the field, but it's a nice-to-have feature.

Images above illustrate how the two navigators display the keyboard. The GTN750, top, presents a full A-Z virtual pad while the GTN650, lower, uses a horizontal slider tape with a zone locator sub-tape below.

tion can be employed to find a fix or navaid. Airways are included, by numbered list, and the logic of entering or exiting these is easy to grasp.

But for those of us in a hurry—isn't that everyone?—the GTNs have a GUI rubberband feature. Here's how it works: If your course is depicted via the magenta line from A to B and you want to go via C, just touch the "graphically edit FPL" icon and drag the line where you want it and the line snaps to that point, automatically adding it to the flightplan list. But what if you move the line into a congested area on the map? How can you control where it snaps? Garmin thought of that, too. The line has sort of an interrogatory function. If there are several snap candidates within range, it will pop up the list as touchable icons and you tell it which you want. This includes airways around a VOR or intersections. (Hey, someone actually tested this stuff…) Also, where the GNS boxes didn't detail flightplans with intermediate and cumulative distances and time, the GTNs do. If you want to add an approach or arrival to your rubberbanded flightplan, you do that through the regular flightplan function page, accessed from the homepage. Looking forward. Garmin says the GTNs are "ADS-B friendly," meaning they have the hooks for NextGen tie ins.

While the GNSs lacked the resolution to include paper charting functions, the GTNs do have this as standard fare. Our impression? Not that bad, but not that great, either. They still do what these devices have been doing from day one: adapting the electronic screen to the limitations of a paper approach plate.

No slam on the GTN that it does this as well as can be expected—maybe better than expected—but other than selection and interoperability improvements, the GTNs haven't advanced the cause fundamentally and we doubt if they will until the industry abandons its hidebound attachment to paper.

The GTN750 can be ordered with either Garmin's FliteCharts or Jeppesen's Chartview. The latter will georeference aircraft position on the chart right out of the box; the former will get that capability in a future software revision. Either way, Garmin's SafeTaxi feature is standard. Data cost is about $1000 a year for 28-day revision for *everything* in the cockpit, not just the GTNs.

CONCLUSION

We would judge these two products to be exactly what we expected. They represent a substantial, incremental improvement over the GNS line, but they aren't revolutionary in capability. They are, after all, selling into a replacement retrofit market. OEM sales will likely be minimal because few new airplanes have displays that require external navcomms. If it's not a single-box, fully integrated solution by now, it soon will be.

Let's qualify the above with this observation: The GTNs are revolutionary in one aspect: They will be easier to learn. You really shouldn't need to crack the POH much to either make this thing play the basic notes or to even master them at Ninja level one. We'll avoid slobbering too much here, but ergonomically, they're as good as we've seen yet.

Garmin says it will continue the GNS430/530 line for another couple of years, but we're hard pressed to see why anyone wouldn't buy the GTN 650 or 750 instead. It's a slam dunk, in our view. Looking to upgrade a 430 or 530? Slam dunk again, for the GTNs.

For the bottom feeders, Garmin has just thrown the megabucket of chum into the water. It's not offering any trade-in deals, so it has no interest in bringing the old boxes back to Olathe for a one-way trip to the crusher. That means dealers will have some flex on trade-ins and a lively secondary market in used 430s and 530s will eventually erupt. But is buying one of these antiques (sorry) a reasonable thing to do, given the inevitable obsolescence? It is.

Garmin says these products have at least another 10 years of support life in them and given that there are so many out there, we suspect they'll be supportable for longer than that.

If the GTNs hit their stride as quickly as the GNS430 did, we expect to see a lot of old Cherokees sporting a pair of 430s bought on the cheap. And that's not a bad thing.

CONTACTS

Garmin International
800-800-1020
www.garmin.com

Oil Supplements: Worth it for Many

We can't guarantee CamGuard or AvBlend will save you money over the long haul. But both seem to have real merit, albeit with different strengths.

by Aviation Consumer Staff

Oil leads a tough life. It's supposed to lubricate, seal, clean and cool the running engine. After shutdown, it's supposed to protect metal surfaces so the next start doesn't scrape off corroded material that's ultimately replaced from your wallet via a premature overhaul.

Oil companies will improve the oil as best they can, but their choices to market a case of oil at the right price might not match your preference for long-term investment in your engine. The bottom line is this: Is it worth up to an extra dollar an hour—maybe $2000 over the life of an engine—to beef up your oil?

We think it is if the supplement in question can back up its claims. Two rise to the top of the pack with approval for certified engines, and enough lab and field data for us to review: ASL CamGuard and AvBlend. We asked both companies for all the data they could supply, and posted a request for comments on our sister publication AVweb.com to see what the experiences of owners and shops have been. The 609 responses we got don't constitute a large sample, but we feel some broad conclusions can be drawn from these opinions.

CHECKLIST

- Lab and field tests show a consistent difference in wear and deposits
- Can't prove it saves money over the long haul
- No product showed a benefit for all users

CAMGUARD

ASL CamGuard's creator, Ed Kollin, did the initial research that lead to Exxon Elite. (Full disclosure: Ed Kollin has frequently served as a source on oil articles for *Aviation Consumer*.) That research included looking at red-tagged parts to try and see why parts failed. "Corrosion was 95-plus percent the reason." Even the scuffing problem in Lycoming cams and lifters, Kollin felt, was actually due to pitting on the hard metal that lead to spalling. "Of our top 10 list, corrosion was one through five."

Kollin proposed a mix of several ingredients for a protection formula, but it proved too expensive for Exxon. Kollin struck out on his own with a modified version that mated corrosion protection with additives for anti-scuff, deposit control and conditioning of seals. Kollin added the latter because the anti-scuff protection in some oils breaks down thermally into a seal-eating compound.

CamGuard has been vetted through a battery of industry-standard tests, as well as modified versions that Kollin claims are closer to the operating environment of an aircraft engine. The results are impressive, in our view. For example, wear protection was increased 10 fold over some base aviation oils and some corrosion tests stopped when an oil-plus-CamGuard mix had prevented corrosion 40 days longer than the nearest competitor. In our short corrosion test (page 11) CamGuard didn't outstrip oils with additives by this much, but in previous (longer-duration) tests, it performed better.

Kollin says that most of CamGuard's anti-wear capabilities are from corrosion protection. He claims a 30-percent reduction in wear metals is typical when using CamGuard. Savvy Aviator principal Mike Busch has been testing CamGuard in his Cessna 310 and reports 10- to 20-percent reductions. In our owner opinion poll, 165 out of 292 CamGuard users reported a reduction in wear metals in their oil analysis.

But this claim is a bit tricky in that total metal must be corrected for the hours flown (since metals accumulate in the oil with time). Maintenance or a change in flying habits can throw off the numbers. We didn't get enough reports from our poll respondents to independently verify these claims, and results can be subtle, as you can see on page 10. Blackstone Labs took a look for us across the board for wear metals in Lycoming O-360-A4Ms using CamGuard versus those that don't (they can see CamGuard in the oil). The results were inconclusive.

AvBlend and CamGuard are the most popular options.

	6	UNIT / LOCATION AVERAGES	5	4	3	2	1
MI/HR on Oil	50		51	30	47	47	20
MI/HR on Unit	1,586		1,536	1,485	1,457	1,200	1,332
Sample Date	05/30/09		03/20/09	12/21/08	11/12/08	09/02/08	07/15/08
Make Up Oil Added		2 qts AVERAGES		1.5 qts	1 qt	2 qts	2 qts
ALUMINUM	3	4	5	4	**10**	6	3
CHROMIUM	3	6	3	3	8	5	3
IRON	28	42	22	15	26	19	12
COPPER	5	5	4	2	4	3	2	4
NICKEL	2	8	2	2	3	2	1
TIN	2	1	2	1	1	1	1
MOLYBDENUM	1	3	2	1	5	3	2	3
NICKEL	2	8	2	2	3	2	1	9
MANGANESE	1	1	1	0	1	1	0	1
SILVER	0	0	0	0	0	0	0	0
TITANIUM	0	0	0	0	0	0	0	0
POTASSIUM	0	0	0	0	0	1	0	0
BORON	0	1	0	1	1	1	0	0
CALCIUM	125	24	68	72	2	0	0
SODIUM	2	1	3	1	0	0	0	1
CALCIUM	125	24	68	72	2	0	0	22
MAGNESIUM	3	1	2	1	1	0	1	2

This TCM IO-360 oil analysis comes from a survey respondent and shows three samples before CamGuard (1-3) and three after (4-6). The numbers show PPM metal in the oil, but these must be corrected for hours flown. Some results are still subtle. This shows an average 40-percent drop in aluminum, 50-percent in chromium, four percent in iron and seven percent in nickel. The high calcium is from the CamGuard itself, and the inconsistency in total engine time is from reporting tach time versus Hobbs.

Kollin stops short of claiming CamGuard will free sticky rings, but he says it interacts with fuel residues that cause many deposits to form. Engine motion over time may free parts, which may lead to lowered oil consumption. One poll respondent told us, "I own the largest piston overhaul shop in Australia … when we tear down the time-expired engines that have been running Camguard they all have less deposits, less carbon and less corrosion than engines not using Camguard."

Reports of lowered oil consumption and cleaner engines also speckled the results, but not with a frequency that made our pulse quicken. CamGuard did its FAA approval testing (which only needs to show the additive does no harm) using a Lycoming IO-540 doing aerobatic flight for 500 hours. Photos of the torn-down engine looked shockingly clean, in our opinion. Even so, we're with many of the aircraft owners who say they won't really know until overhaul.

We didn't ask specifically about weeping seals on our questionnaire, but several respondents volunteered that CamGuard helped with this problem. This isn't conclusive but it did catch our attention.

AVBLEND

AvBlend's pedigree dates back to the late '40s (with roots even earlier) to deal with cold-start scuffing issues in auto racers. The product, called Lenckite, found aviation through Ed Rachanski Sr., a funny car racer and builder who went on to found an FAA Repair station, Blueprint Engines, at Chicago's Midway Airport.

AvBlend was field tested for FAA approval at Executive Helicopter in Chicago using a Lycoming HIO-360-C1A in an Enstrom helicopter used for traffic work. The testing ended five overhauls later when the cylinders had 7787 hours on them (one finally developed a head crack). They were just then reaching their service limits. On each of the overhauls, parts turned up exceptionally clean, particularly around problematic valve guides.

What's called AvBlend in the aviation world is also sold for over-the-road use as ZMax. This product got wound up in an FTC lawsuit over claims made by the company about specific performance gains a consumer would see. The silver lining to that suit, as AvBlend's Ed Rachanski Jr. will point out, is that the company did $2 million in lab testing, which verified its claims for decreased wear, increased performance, deposit control, corrosion protection and more.

AvBlend's test documents show that much of this testing was done with automotive oils in automotive engines, and we can't say how applicable those findings are to aircraft engines. Looking only at the single-cylinder lab engine (CLR) tests using aircraft oil and ZMax (AvBlend), however, still shows 17-percent reduction in blowby, a six-percent reduction in piston-skirt wear, a two-percent reduction in exhaust-valve wear, and about an 8.5-percent gain in power and efficiency. All were shown to be

BUTTER ON A CAT'S BEHIND

The problem with substantiating company claims via our owner opinion poll is that operational differences from owner to owner or engine to engine could account for a larger difference than the total effect we're measuring. It's also true that the greatest benefit might not be noticeable until it's time for overhaul.

Of the 609 aircraft owners and mechanics who answered our questions, we heard from more CamGuard users than AvBlend users, which may reflect more aggressive marketing. A large majority of the CamGuard users believed the product worked and was worth the investment. Slightly over a third of the AvBlend users felt the same. Digging deeper, we saw consistent reports of less corrosion and scuffing at overhaul for both AvBlend and Camguard. AvBlend users reported better compression, less buildup, valve sticking cured and less engine-related maintenance costs more often than did CamGuard users. We found it curious that users of Marvel Mystery Oil mirrored the results in those same four areas.

All this said, the majority of users didn't see a majority of effects. We don't think this invalidates the overall findings, but it makes the point that your mileage may vary. As owner put it, "Like putting butter on a tomcat's behind, it didn't help and didn't hurt."

CORROSION COMPARISONS

Additive packages in oils claim to do several things, but we think corrosion control is near the top of the list of concerns because as flight activity continues to decline, engines sit idle for longer.

Not all of the additives on our shopping list claim to enhance corrosion protection, but we included them all in two informal bench tests to see how they compare.

We prepared 20 mild steel coupons which were polished and cleaned with acetone. We mixed the additives according to the product instructions using Shell 100, which has no corrosion additive itself, as a base oil and we heated the additized oil samples to 200 degrees. We then dipped each sample into the mixture for 20 minutes. For the AvBlend and Friction Master products, we soaked the samples for an hour at 200 degrees.

Once the samples drained, we exposed them in a shaded area and, in two separate tests, misted them once a day first with 1% saline solution, then with plain water. We wanted to see if the manufacturer claims would hold up in the real world.

Bottom line: They generally did. But there were surprises, too. In our 21-day plain water test, corrosion appeared on an unprotected sample within three days, while a coupon treated with just the Shell 100 lasted another two days before showing corrosion. The Lycoming additive—which makes no claims for corrosion enhancement—went 17 days before showing the initial pits of rust.

The surprise was the VpCT 326 and Engine Guard Aero samples. These products are not sold as operational additives but as pickling agents. Yet 12 days into the trial, the VpCT 326 sample showed clear corrosion and so did the Engine Aero Guard. The Friction Master sample also corroded noticeably by the 13th day.

By comparison, the AvBlend and Camguard samples were still rust-free at 21 days, which suggests to us they do indeed improve the corrosion protection of an unadditized oil like Shell 100.

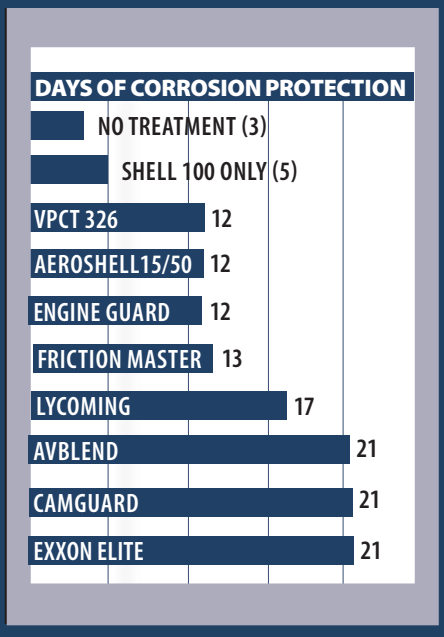
For comparison, we also included Exxon's Elite and Aeroshell 15W50 in our experiment. At 21 days, the Elite was still going strong, far outperforming the two products intended as engine preservatives. Elite also beat out Aeroshell, which showed a bright bloom of corrosion at 12 days.

For the more aggressive test with saline solution, we measured the percentage of the coupon covered by corrosion at the end of seven days. To calculate the percentage coverage, we photographed the coupons and superimposed a photogrid.

Here, Aeroshell was the clear winner, with Elite, AvBlend, Camguard and the Lycoming additive grouped around the middle. Worth noting is that the Elite-protected sample had small, barely discernible specks of rust, while the others tended toward larger blooms and splotches. We're not sure this is significant other than to say less rust has to be better.

Again, the surprise here is that the engine pickling agents—VpCT 326 and Engine Guard Aero—didn't seem to do much better in protecting against corrosion than good quality oils with anti-corrosion packages, such as Elite and Aeroshell. And not all of the additives did much better than oil alone for this trial, although they clearly did in the longer term water mist trial.

Conclusion: If we were putting an engine into storage, we would be more inclined to use fresh Elite, Aeroshell or Camguard in something like Phillips XC than we would bothering with a preservative oil. We're not convinced they provide much additional protection, if any.



This Lycoming IO-720 has 1600 hours on it, all of them with AvBlend. The cylinder was removed for a leaking base O-ring. It was the first major engine work in 13 years.

statistically significant. Lab data also supports wear reduction and corrosion resistance, albeit using automotive oils. In our own corrosion tests, AvBlend did as well as any of the other supplements.

In our field interviews, the first thing that popped up was deposit control. "An AvBlend engine sticks out like a sore thumb," said Dave Allen of Poplar Grove (one of our top-rated engine shops). "I can tell because they're so clean." We asked Allen if he felt there was a higher instance of serviceable parts in these engines. He felt there was probably less wear, but couldn't say for sure.

American Flyers ran field tests on AvBlend in 1992 hoping to reduce incidents of valve sticking. After a cumulative 375,000 hours, the report was a 75- to 80-percent reduction. Current Director of Maintenance for American Flyers, Rick Farmer, says they still use AvBlend with every oil change, and the valves and engines are currently much cleaner than average. Several owners and Bill Middlebrook of Penn Yan Aero reported AvBlend curing valve issues.

For AvBlend, 29 out of 92 users reported lowered metals in their oil analysis data. Again, we didn't get enough actual test data from respondents to assess those claims by press time. However, one owner told us he stopped doing oil analysis because "the readings were so low."

Howard Fenton, who sold his oil analysis business to Blackstone Labs, conducted an informal audit of 50 randomly selected airplanes whose owners reported they started using AvBlend. He didn't see any significant changes, however, he admits he was only looking at raw data without statistical analysis.

In our opinion, field evidence for wear reduction is stronger. The company touts Sean Tucker's six-minute flight with zero oil pressure after a part failure. We spoke directly with Ken Tunnel of Lycon, who does Tucker's engine work. "From the paperwork and the download [from the engine monitor], I would never have guessed it ran with no oil for six minutes," he told us. "I would have at least thought it would have got the crank." Tunnel treats all new Lycon engines with AvBlend.

Turning back to the opinions of pilots who wrote in, we were unimpressed with comments like, "My engine ran to TBO with no problems." Plenty of engines do that. We were more impressed with: "My 2250-hour cylinders were in good enough condition to warrant a credit against my new cylinders," and, "At 1500 hours the engine was torn down by ECi for prop strike inspection. They called me questioning if this engine really had 1500 hours, thinking it was a misprint." There were several like comments.

Unlike CamGuard's cocktail approach, AvBlend describes its product as "a tenacious micro-lubricant with reformulated micro-molecules that penetrate, clean and protect metal from the inside out."

According to Ed Ranchanski, Jr., this means it can weep out and protect metal even when the oil would be burned away by the combustion process, and is why it is effective on valve guides and rings. The logic is that better sealing means both more power and fewer blowby products promoting corrosion. It would be interesting to see if AvBlend-treated engines show less lead in the oil, a byproduct of blowby. AvBlend has lab data showing the stuff penetrates bare metal deeper than oil alone. They also have measurements from AvBlend-treated engines showing a fraction of typical valve-guide wear at overhaul.

MORE OPTIONS

In our corrosion testing, we looked at several other additives on the market: Marvel Mystery Oil, VpCI, Lycoming's LW-16702, Engine Guard Aero and Friction Master. But this list has limited applicability. LW-16702 is simply an anti-scuff and incorporated into many oil formulations already. VpCL and Engine Guard are primarily preservatives for storage.

Marvel is well-known and loved by some, but it's not for use in certified engines. Friction Master is a Teflon treatment similar to the now-rare Microlon. It's not currently approved for certified engines, and we haven't seen enough general data on Teflon treatments to convince us they provide a tangible benefit.

One option is not using any additive. We found it interesting that out of 527 owners who tried at least one oil additive, only five percent felt the additive did nothing for them at all.

AvBlend retails for $18.95 per can from the company. Some online sources are cheaper. They recommend one can per oil change for most four-cylinder (eight-quart sump or less) engines and two cans for larger ones. The recommended interval is every 25 hours, with a maximum of every 50.

CONTACTS

AvBlend
877-282-5363
www.avblend.com

CamGuard
800-826-9252
www.aslcamguard.com

CamGuard's recommendation is five percent CamGuard every 25-30 hours, but many owners report going 50 hours. It retails for $24.95/pint. Unlike AvBlend, you can store unused CamGuard for later changes.

Running these numbers out on a Lycoming IO-360 with 50-hour changes, that's $758 over a 2000-hour engine run for AvBlend and $798 for CamGuard—40 bucks in favor of AvBlend. Try a six-cylinder TCM O-470 with a 12-quart sump and you need two cans of AvBlend. That makes the math $1516 for AvBlend versus $1198 for CamGuard. Change your oil every 25 hours and it's $3032 compared to $2396—a $636 difference. There are some engines where the delta is larger.

And, yes, the only difference in the formula of AvBlend and Zmax is the color of the dye. This is not true of the different formulations of CamGuard.

HOW TO CHOOSE?

This brings us full circle to our original question of whether it's worth the $1000-2000 over the life of the engine. We'll make a qualified "yes." Escaping even one cylinder replacement or getting an additional 100-200 hours out of your engine would pay for the investment.

Based on lab tests, field tests and owner comments, we've come to a split decision. When premature top overhauls or valve issues are the concern, we'd try AvBlend. If your engine isn't flying regularly, then corrosion is your archenemy. For corrosion and corrosion-induced wear, our preference would be CamGuard.

The trickier question is what to do with a new engine that will fly regularly. Frankly, regular use and frequent oil changes are probably your best insurance. But a supplement could hedge the bet. While it's easier for us to wrap our heads around the package approach of CamGuard's formula to the single-solution approach of AvBlend, we can't deny the weight of evidence that AvBlend delivers on its claims to a measurable degree.

Until we have side-by-side data to suggest otherwise, we can only recommend going with the evidence you find most convincing and sticking with the program until something convinces you otherwise.

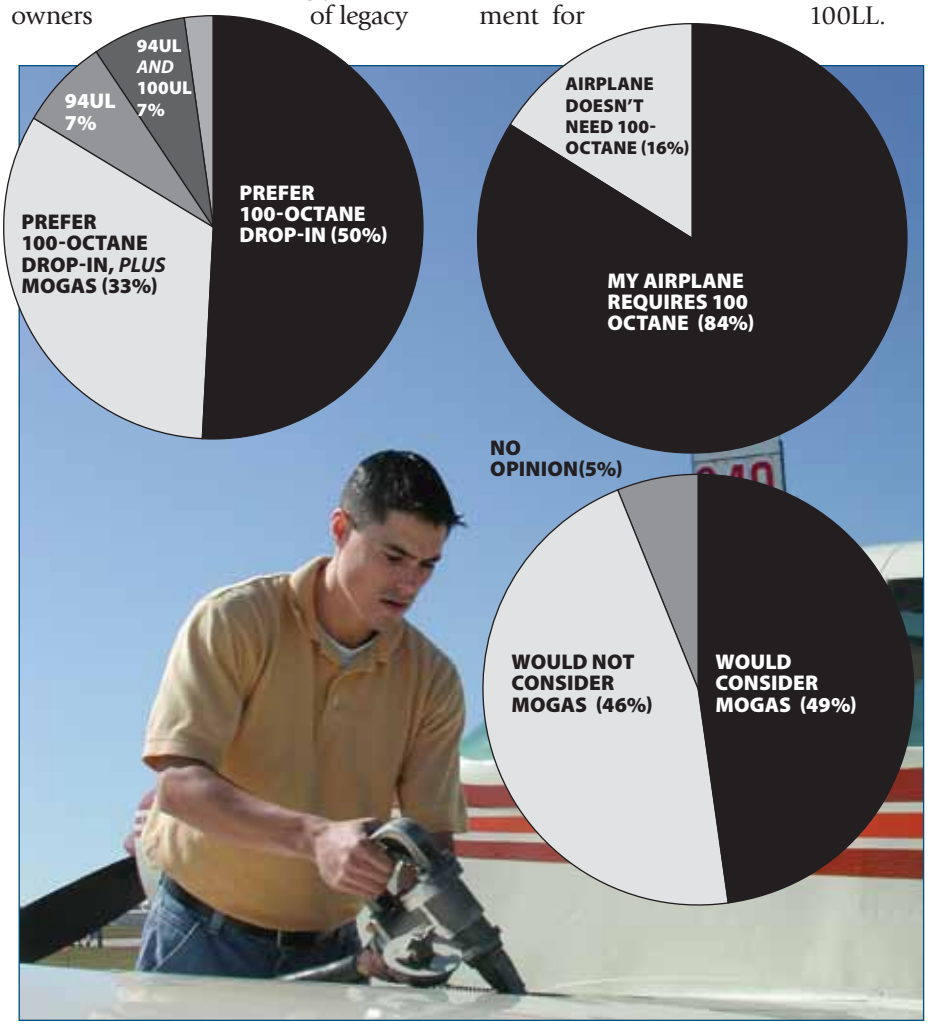
Avgas Survey: Owners Want 100 Octane

But mogas as a second option has strong support, too. Owners show little interest in 94UL or the engine modifications necessary to burn it.

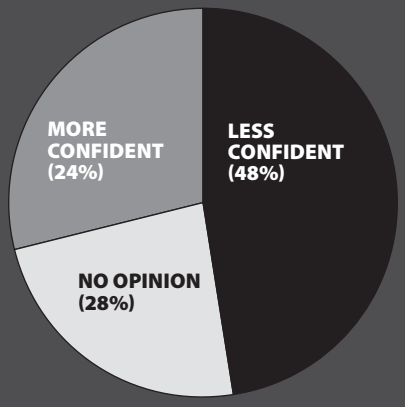
by Paul Bertorelli

Imagine a world in which you're considering an expensive new luxury car, only to be told by the dealer that fuel to run it may be legislated out of existence in five years, but don't worry, someone will come up with something. This is exactly the conundrum buyers of new aircraft face and, increasingly, so do owners of legacy airplanes considering upgrades such as paint and avionics. We wondered if lack of confidence in future fuel supplies is putting a drag on the market, so we asked.

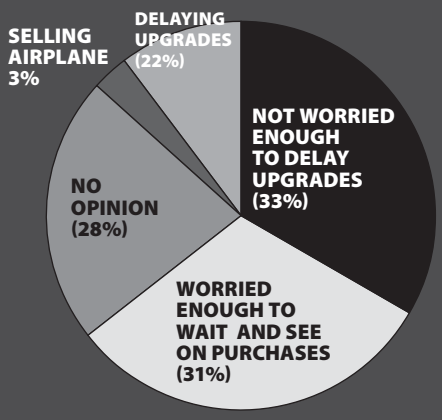
In a survey published on our sister publication, avweb.com, more than 3100 owners and pilots gave us their opinions on the quest for a replacement for 100LL.



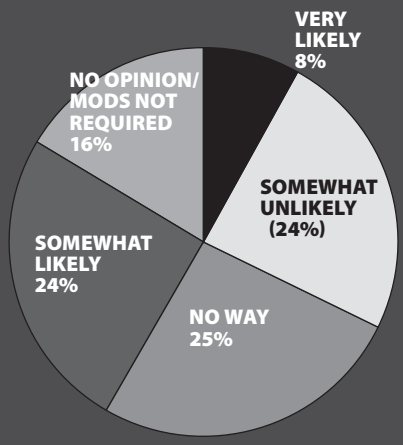
Does the fact that the EPA said there's no timeline make you more or less confident in the future of 100LL?



With regard to level of confidence in future supplies, which describes your opinion?



How likely are you to consider modifying your airplane to burn lower-octane fuel?



Among the findings: One in five owners told us they're definitely delaying any purchases or upgrades and more than half—53 percent—say they're either on the fence about purchases or definitely not buying until the fuel situation clarifies.

Although the industry alphabet groups and EPA have tried to assure owners that the agency has no definite time schedule for cracking down on the lead emissions that may eliminate 100LL, owners don't seem to buy this. Only one in five told us these statements made them more confident a suitable fuel will appear soon, but nearly half (47 percent) told us such statements made them less confident. Reader comments revealed a mistrust of EPA intentions.

"For the EPA, doing something unnecessary, and potentially disastrous for the most active part of the piston fleet, is clearly not better than doing nothing at all," said Bill Emde. "Do away with the EPA, not 100LL," offered another reader.

As for a replacement fuel, the strongest preference seems to be for a 100-octane drop-in replacement, with the second-pick preference 100 octane with mogas as an on-field option. There's little support (7 percent) for 94UL, an approved aviation fuel, a variant of which is sold in Europe.

"If something like 94UL becomes the standard, than operators that require higher-octane fuel will be left out in the cold. If we're talking engine modifications, I hope somebody is going to study how many high-octane engines even have STCs for burning lower-octane fuel. The cost of developing an STC from scratch could make this option unavailable," said Dave McClurkin.

Although there's no lack of activity on the fuel replacement front, all of it seems to be top down: Two companies that we know of are proposing 100-octane replacement fuels, ASTM International is considering these for approval and the FAA is getting involved with a new rulemaking committee. But as far we know, no one has asked pilots and owners what they want and what they're willing to buy. So we did.

AVGAS BURNERS

Our survey consisted of 32 questions related to replacement fuels and also provided an open comment section. Generally, we wanted to know how closely owners are following the fuel quest (for the survey respondents, very closely), what kind of fuel they want for their aircraft and whether they'd be willing to pay for engine modifications to burn fuels of less than 100 octane.

By early March 2011, 3117 respondents, 98 percent from the U.S. and Canada and 86 percent of them owners or partners had replied. The survey response was lopsided in one regard: 84 percent of those who replied said their aircraft required 100-octane fuel, while the rule of thumb in the industry is that about 30 percent of the fleet requires 100 octane. The reason for this lopsidedness is obvious: Owners of higher-performance aircraft have expensive investments and they have the most to lose in terms of decreased value which may worsen as the fuel search drags on. Although our survey revealed no strong trend among these owners to sell their airplanes now, a few told us that's exactly what they plan to do.

"If avgas continues to rise in price, I will sell my airplane and stop flying," said reader David Stevens.

Pilots who replied to the survey don't have a high degree of confidence that a fuel solution will be found soon enough to stanch market erosion. Almost half—47 percent—told us that last summer's announcement by the EPA that there is no timeline for lead regulation makes them less confident in a future fuel replacement. Only 20 percent said those statements made them more confident.

"The FAA does not pay for my fuel or any repairs or anything associated with the planes I fly. The industry has the best knowledge of what planes, pilots and the best gas for the engines they build. The FAA and EPA have long been full of stuff. They need to listen to experts and the industry, not a bunch of armchair want-to-be pilots," opined Richard Young.

In our view, the larger worry is the owners we hear from who say they're waiting on the fuel situation to clarify before upgrading their airplanes or buying something new. Based on our e-mail, we would have guessed this to be about one in five owners, but the real percentage may be higher.

NO WORRIES

Exactly a third of our survey respondents said they weren't worried about fuel and would buy or upgrade accordingly, but 22 percent said they definitely would not do this, while another 31 percent described themselves as on the fence. Summary:

More than half of potential buyers feel enough worry about fuel supplies to have it impact their potential purchases.

"I was starting to research engine overhaul versus trade-up options just as the avfuel issue surfaced. I will not spend any capital on a major overhaul, upgrades or trade-up options until the fuel situation has been resolved. If there were a viable diesel option, I would consider that direction and just leave the 100-octane problems behind," said D. Brown.

Attempts to tamp this down by a don't-worry-we're-working-on-it campaign by AOPA, EAA, GAMA and even the FAA may or may not be helping. The majority of pilots—60 percent—told us they thought the industry shouldn't panic over future fuel development, but 27 percent say they want a more aggressive response to the problem than they're seeing.

And who should be leading this? Owners are split on this question. About 36 percent thought the FAA should be more involved in fuel development, while 37 percent thought the solution should come from industry. The rest had no opinion.

"I don't trust the FAA to make the best decisions for the GA community on avgas. Too much influence from lobbyists and not enough input from the pilots and mechanics. Ideally, make a new source for 100 octane from biomass or similar and obtain enough mogas for the aircraft that don't need the 100 octane, but at a reduced cost. We used to have 80- and 100-octane pumps everywhere; why can't that continue? We're too shortsighted on possibilities and innovation," said one owner.

WHAT'S WANTED?

As expected, owners of airplanes that require 100-octane fuel want a 100-octane replacement. Exactly 50 percent picked a 100-octane direct drop-in replacement as their first pick, even if it costs more. Why isn't this number higher, given that eight of 10 respondents own airplanes that require 100-octane fuel? The reason is that there's strong support for mogas as a second fuel, even among owners of high-performance airplanes. Some 33 percent picked 100-octane and mogas as a second fuel as their preferred replacement strategy, something we see as significant.

But the data revealed some interesting trends. First of all, only about 100 airports have mogas available—only 7 percent of survey responders said their airports had it. But even though the majority of owners said they would consider using mogas, only 15 percent said they had asked their airports to provide it. This confirms what we've heard in our interviews with FBOs: They're not hearing owner demand for mogas.

Even though they like the choice of mogas, owners are savvy about the low likelihood of it being practical because of ethanol penetration into the mogas market. Nearly half of them (47 percent) said mogas as part of the GA fuel solution is so unlikely as to be a non-starter, while just one in five consider it very likely. But most do favor an effort to encourage the FAA to pressure EPA to segregate at least some of the domestic U.S. premium mogas supply from ethanol, sparing it for aviation use. The likelihood of this happening seems low, but owners favor it anyway.

94UL, MODS: NO, THANKS

Our survey revealed little interest in 94UL as a replacement avgas. There's also not much enthusiasm among owners for modifications that might be necessary in order to burn a fuel of less than 100 octane.

Just 7 percent favored 94UL as a drop-in replacement for the current leaded avgas, compared to 50 percent who want a 100-octane solution of some kind.

When we asked owners what kind of modifications they would perform in order to burn a lower-octane fuel, more than half said they would be unlikely to consider any modifications. Only 8 percent said they would be likely to make mods, while another 24 percent said they would be somewhat likely.

What kind of mods? We asked about installing low-compression pistons, full FADEC systems, operating at reduced power or perhaps buying a simpler electronic ignition system to improve detonation margin. Owners seem to like that last idea best. Almost 40 percent said they would consider a system like that, if it's technically feasible. (We're not sure it is.) Operations at reduced power and low-compression pistons are a loser. Neither of these generated more than 10 percent approval. A full-up FADEC appealed to about 14 percent of those who replied—not bad, but not evidence of a strong market, in our view.

Comments from Steve Cochard summed this up: "I have a Piper Arrow IV. Just replaced the engine with a Lycoming factory reman. It is an IO-360 and is high compression and therefore requires 100LL. Cost a ton of money to repower the airplane, and the performance is now awesome. I don't want to pay additional money to decrease the power or make modifications to the engine to unpower the airplane. Doing that in this case would, one would think, be stupid."

Owners told us they're definitely holding off on upgrades like painting, upper right, or a new airplane that requires 100-octane fuel, such as the Cessna 206, right.

Lightspeed's New Zulu: Clearer, Quieter, Comfier

Lightspeed's new Zulu doesn't so much close the gap on the Bose A20 as accentuate the differences. Zulu is still our pick for audiophiles and long-haul fliers.

by Jeff Van West

For years, Lightspeed's Zulu was our favorite headset for its winning combination of comfort, quiet and features, like Bluetooth cellphone connectivity. Last year, at Oshkosh AirVenture, Bose leapt into the 21st century with their new A20, improving their ANR and comfort, as well as adding Bluetooth for cell phones and a jack for external audio.

We tried an A20 at Airventure, on the long ride home and beyond. Our verdict was that head-to-head, we preferred the Bose, but weren't sure it was worth the $200 price delta.

LIGHTSPEED RETORTS

Lightspeed has updated the Zulu with improved systems, a slightly changed look and a price they tell us will be "slightly higher than the current Zulu." The model name is simply the "NEW Zulu," and will phase out the current version. Big changes are 20-percent less clamping pressure, a new ANR system touting better clarity and less white noise, a new mic that also cuts background noise, and improvements to Lightspeed's Front-Row Center system for music.

We took a demo version of the new Zulu for flights side-by-side with the original version and a Bose A20. Because our demo Zulu was packed into the same earcups as the old version, we were able to do some blind testing with volunteer pilots. We didn't mention any of the differences before the test. Three of the six told us they couldn't tell the difference, but the other three correctly identified the new Zulu with some confidence. The big giveaway was apparently the clamping force, which all three interpreted as feeling lighter than the old Zulu.

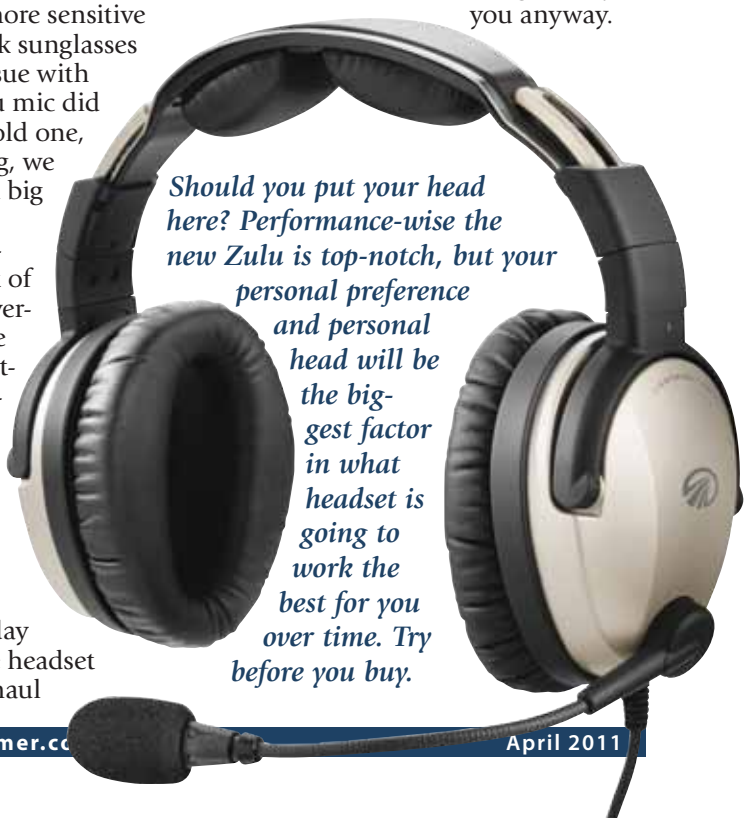
Interestingly though, all six pilots felt the Bose A20 was a bit quieter or had a "more surrounding quiet." We agree. The best way we can describe it is that we think they are about equally quiet, but where the Zulu sounds like flying in a really quiet airplane, the Bose A20 sounds like sitting in a quiet room with someone piping in a bit of airplane noise. We felt the Bose had more clamping pressure and was more sensitive to a poor ear seal. Thick sunglasses could be more of an issue with the Bose. The new Zulu mic did seem crisper than the old one, but practically speaking, we don't see this making a big difference.

Music quality has always been a strong suit of the Zulu and the new version builds on this. The Bose is excellent, but sitting in the office listening to Martin Hayes playing Irish reels on the new Zulu was like wearing professional recording headphones. It was even good when listening to music via Bluetooth. Working a day at the desk wearing the headset is a good test for long-haul comfort and the new Zulu is, in our opinion, the most comfortable over-the-ear headset we've worn.

That said, both the A20 and the new Zulu are a treat to wear, and noise-cancelling technology has gotten so good that trying to hear which headset is quieter is like trying to count hairs on an inchworm. Your preference for sound and fit will be the biggest factor in how happy you'll be with a Zulu versus an A20.

Features may make a difference. We're fans of the sidetone on the Bose cell phone connection, which lets you hear your own voice while talking. We also like that one A20 can be used with both Lemo plugs and standard jacks, and that the cord can be attached to either earcup. The Zulu can use cable or Bluetooth for both phone and music, where the Bose is Bluetooth for phone and cable for music. The Zulu also has separate volume controls for auxiliary sound and intercom audio.

Has our A20 versus Zulu opinion changed? Not really. As we said in the September 2010 review of the A20, if the two headsets were sitting on the table and we were going out flying, we'd grab the Bose. If we had to cough up the cash, we'd probably buy a Zulu. Because we don't know the exact price for the new Zulu yet, that math might change. But if you regularly fly for many hours at a stretch or are a stickler for studio-level music, the new Zulu might sway you anyway.



Should you put your head here? Performance-wise the new Zulu is top-notch, but your personal preference and personal head will be the biggest factor in what headset is going to work the best for you over time. Try before you buy.

CONTACTS

Lightspeed Aviation
800-332-2421
www.lightspeedaviation.com

Picking Progressives: The Right Lens is Key

And plan on a frame with an adjustable nose pad. How these things fit is critical. For sunglasses, polarized are recommended for use with acrylic windshields.

by Bob Glass

Your 45th birthday is a memory. You caught yourself squinting at the gauges on a recent approach to minimums. The near-vision test on your last medical? You passed it—barely.

You have presbyopia, or old eyes. This term probably made sense 120 years ago, when 40 was old, but the term persists. It's the result of the loss of elasticity in the crystalline lens in the eye, which allows us to zoom focus on near objects. Because it's the lens getting stiffer, not the focusing muscles getting weak, no amount of exercise will resolve the problem. The problem gets worse with age, no matter what you do.

PROGRESSIVE THINKING

To better understand your options for progressive lenes, take a look at your vision in general. If you're nearsighted and wearing distance-only glasses, you may have excellent near vision without your glasses and be more comfortable without glasses for reading than with progressives. That works fine at home, but not in the cockpit, so progressives are still a necessity.

If you're a pilot who wears contacts for distance and has difficulty reading, your options are limited. Bifocal contacts don't give the acuity you need, and monovision (one eye for distance and one for near) is not allowed by the FAA. You must use either single-vision reading glasses over the contacts or progressives over the contacts. In these cases, you may simply be better off using progressive lenses alone for flying.

Have you had LASIK or cataract surgery? Custom digital (high definition) lenses may be the best choice because these surgeries sometimes induce or fail to correct higher order aberrations. These digital aberrations are not correctable with ordinary progressives, but they are correctable with wavefront technology.

Don't hesitate to interview a prospective doctor to see if he is experienced with progressive lens designs and if he has experience with pilots. The right optometrist is the one who will best serve your needs. Be prepared with a complete history of eye care, including past prescriptions, and any current eyewear. Make careful measurements of your cockpit environment. It's important to know the distances between your face and your charts, instruments and avionics. A photo of your flight deck is useful. If you fly several aircraft, photograph and measure them all.

Knowing the distances and widths of the areas of visual demand is essential in selecting the proper lens design and power. If you habitually hold your approach plates 16 inches from your face, the progressive strength would be different than if it were 20 or 14 inches.

TIPS FOR DIFFERENT EYES

If you've never needed glasses until you hit 40-something, and then only for reading, you'll have some adjustment transitioning to glasses. The good news is, you don't need glasses all the time (only when you want to see, I tell my patients) and you have the largest choice in lens designs. Make sure that you choose a frame size that will allow at least 18 mm from the fitting point to the bottom of the frame. This becomes increasingly important as you go from age, say, 42 to 58 and the reading power increases.

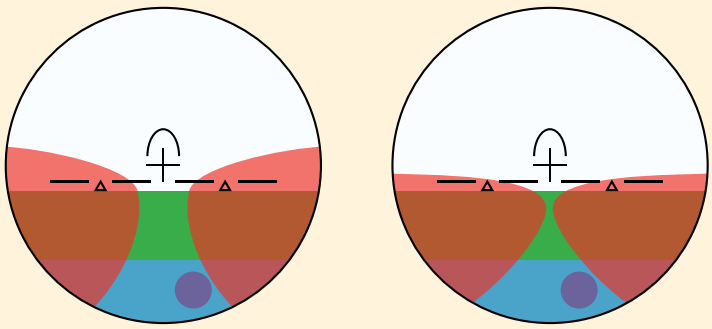
CHECKLIST

- ⊕ Progressive lenses aren't your father's bifocals. They offer smooth visual transition.
- ⊕ Progressives are available for even tough prescriptions.
- ~ Manufacture and fitting are critical, as is matching the design to your cockpit needs.

PROGRESSIVE LENS: YOU CAN'T SEE IT ALL, ALL THE TIME

Progressive lenses have a wide distance portion, a midrange channel and a near section. The changes in powers from the distance to near sections are seamless, meaning there is no discontinuity of vision throughout the vertical centerline of the lens. This vertical corridor is the vertical umbilic, and the curvatures at any point in this vertical blending meridian are equal. However, away from this vertical centerline, at any point below the distance segment of the lens, the curvatures begin to differ and this difference increases rapidly towards the lens periphery. This is called unwanted astigmatism, and is the critical challenge in designing, fabricating, fitting and using progressive lenses.

Power and size matter. A lens for a vertically smaller frame has more lateral distortion issues than a vertically larger frame. The rate of change of unwanted astigmatism around the vertical centerline increases more rapidly as the bifocal power in the bottom of the lens increases. So, as you get older and need more near power, the lateral useful area of the progressive lens decreases.

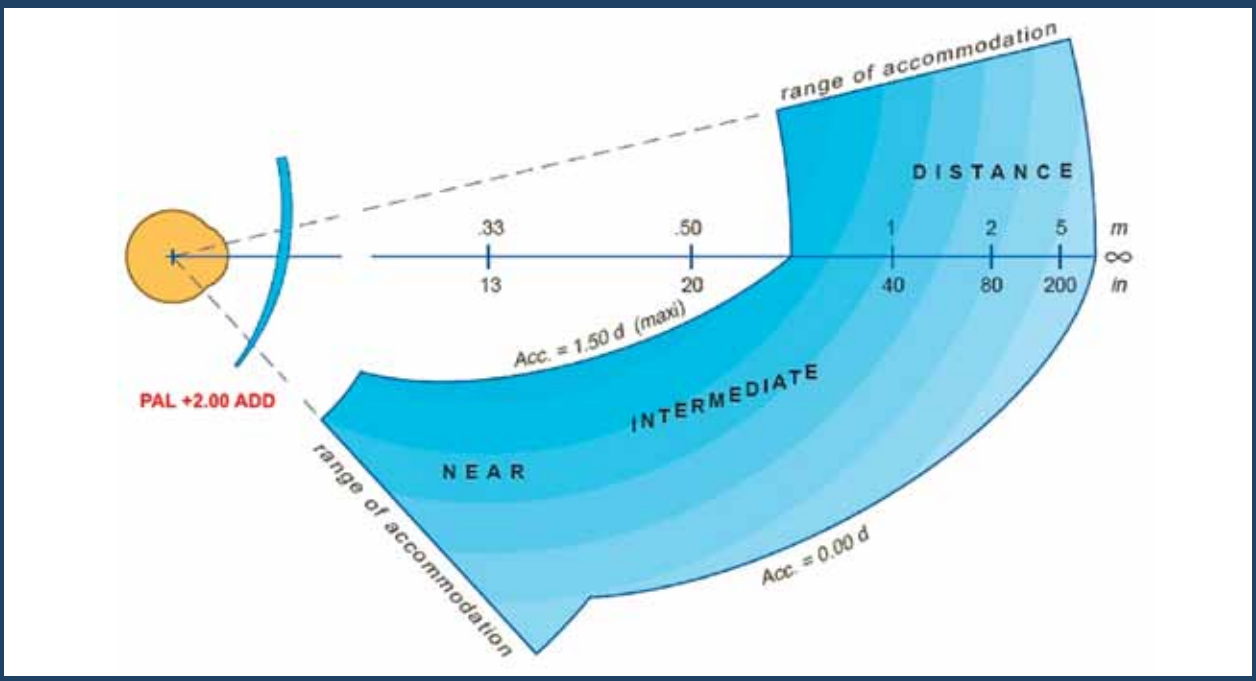


The white area at the top is for far vision, with focal power just above the plus sign. The green is for intermediate vision at 18-30 inches and the blue area is for near vision at 14-18 inches. The red shading is the approximate area of at least some distortion. The purple dot is for full bifocal add power.

Fitting point is very specific. An error of 1mm can mean the difference between success and failure. A horizontal error of 2.5mm will reduce the near visual field up to 40 percent. As in aviation, you need to keep it on the centerline.

In the past, progressives were either "hard" or "soft" in design. The hard designs pushed the unwanted astigmatism as far to the periphery as possible, giving a wider area of useable vision. The drawback is that the peripheral distortions are more severe, creating a swim effect. Soft designs spread the unwanted astigmatism over a larger area, decreasing the useful lateral range of vision in the mid to near sections. That meant less swim, but less useable vision.

Today, most of the premium lens designs incorporate features of both designs, based on computer-generated profiles. Some designs place an emphasis on the distance portion of the lens, while others favor on the midrange and near portion. You have to think about what matters most to your visual condition, your age and your flight environment (glass versus analog panel, for example).



Sunglasses are fine, although you'll need second glasses for night flying. Frame height matters, as less vertical space may increase distortion.

The adjustment for nearsighted pilots (can see better at near than in the distance) depends on how nearsighted you are, and if you have astigmatism. If your prescription is relatively low (-1.00 to -2.50) with little or no astigmatism, you have a lot of choices. Just make sure there is enough vertical room in the frame. If you are more nearsighted, say above -4.00, you want to keep the frame size smaller and use either polycarbonate or high-index plastic (high index means less lens material to accomplish the desired change in power). Rimless frames may work, but the edge thickness becomes more visible; don't try if you are over -6.00.

If you're farsighted, again, a lot depends on the magnitude of your prescription. Luckily, you'll adjust to progressives quickly, because you can't see well without them. Up to around +2.00 in the distance, there's little limitation. Above +3.00, frame size matters, you don't want rimless frames at all (the center of the lens would be quite thick) and you do want polycarbonate or high-index.

Astigmatism means your eyes are not round. This is something you were born with and no amount of focusing can make a football-shaped eye see clearly. Correction has three components: sphere, cylinder and axis. The sphere is the nearsighted or farsighted component, and may even be zero. The cylinder is the magnitude of the astigmatism, and the axis is the orientation of the astigmatism (picture a football with a stick through its points so the football spins around the stick; that is the axis of the astigmatism). Your prescription will look like this: +1.00 -2.00 X 180. The sphere is +1.00 (farsighted), the cylinder is -2.00 and the axis is 180 degrees. Any cylinder greater than -2.00 is something you should discuss with your optometrist to get the best advice for your specific situation.

Have the eye exam and have your glasses, if needed, made well in advance of your next medical. Allow at least 4-6 weeks.

Anisometropia (unequal eyes) is the biggest challenge. Thickness of the lenses will be different, and in the higher prescriptions, this could cause double vision in the reading area. This is a situation you, again, should discuss in depth with your optometrist.

No matter what your condition, if any of the numbers are plus/minus 4.00 and greater, thickness becomes a consideration with respect to frame size. If you have a -7.50, you really want the smallest frame possible.

WHICH LENSES?

All of the several major progressive-lens manufacturers will tell you that their product is the best. Some are better than others in certain situations such as higher prescriptions or unusual frame designs (such as small vertical size or wrap sunglasses). There are also differences in price, and sometimes it's worth the difference. But sometimes it's not.

The largest companies include Essilor (Varilux), Signet Armorlite (Kodak), Sola (VIP), Zeiss (Individual) and Younger (Image) and Hoya (Hoyalux iD). Each one has advantages and disadvantages. For example, the Sola VIP has the largest reading area, but at the expense of the distance periphery. The Varilux Physio and Zeiss Individual are excellent high-end lenses, and the Signet Armorlite Kodak and Younger Image are all-around lenses that work well in most cases.

Younger recently released the Adage lens, which is supposed to be useful in cases with a smaller vertical dimension. Traditionally, 16 to 18mm is the minimum distance from the pupil to the bottom of the frame, and they claim it works with as little as 13mm. Signet Armorlite also makes the same claim for their Kodak Unique lens (I personally feel better about 18mm minimum).

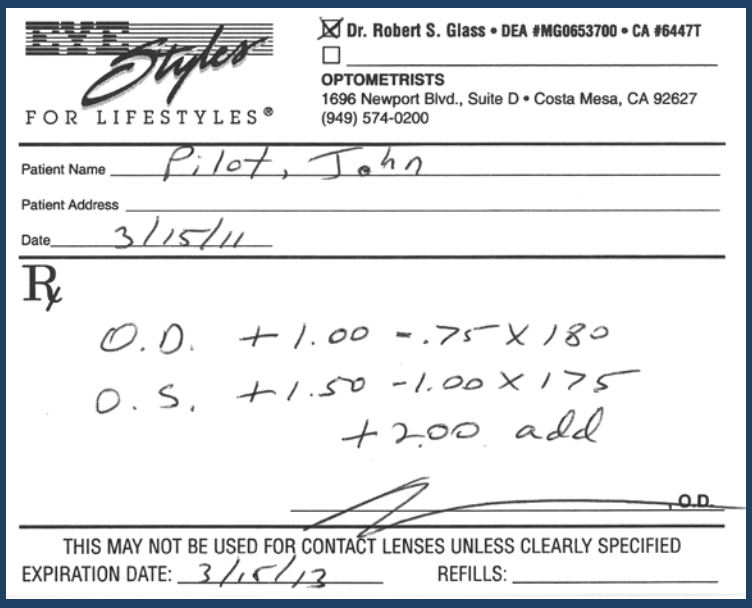
There are several methods of fabricating progressive lenses today. These include traditional surfacing,

HOW TO INTERPRET YOUR PRESCRIPTION

Eyeglass prescriptions are written in diopters. One diopter is the power it takes to focus light from infinity (beyond 20 feet) to a point one meter away. Therefore, a +2.50 diopter lens converges light to a focal point of 40 cm. A minus lens, used for nearsightedness, has the opposite effect; it diverges the light.

Distance prescriptions have up to three numbers, sphere, cylinder and axis. The sphere is the base power of the lens, and may be plus or minus. Cylinder refers to the magnitude of the astigmatism, and is usually a minus number by convention. Axis refers to the orientation of the astigmatism and may vary from 1 to 180 degrees, 180 being horizontal and 90 vertical. All of the lens power in the astigmatism correction is 90 degrees from the axis.

In this case, the right eye (O.D.) is a little bit farsighted (+1.00) with a small amount of astigmatism (-.75) and the axis of orientation of the astigmatism is 180 degrees, horizontal, which means that the effective power of that astigmatism is vertical. Simply put, the lens has a power of +1.00 in the horizontal meridian, and an effective power of +.25 (+1.00 added to -.75) in the vertical meridian. The majority of the lens power is therefore in the horizontal plane, and the lens will be thickest on the sides.


EYE Stylers
FOR LIFESTYLES®

☒ Dr. Robert S. Glass • DEA #MG0653700 • CA #6447T
☐ _____
OPTOMETRISTS
1696 Newport Blvd., Suite D • Costa Mesa, CA 92627
(949) 574-0200

Patient Name Pilot, John
Patient Address
Date 3/15/11

℞

O.D. +1.00 -.75 X 180
O.S. +1.50 -1.00 X 175
+2.00 add

O.D.

THIS MAY NOT BE USED FOR CONTACT LENSES UNLESS CLEARLY SPECIFIED
EXPIRATION DATE: 3/15/13 REFILLS: _____

There is also a near power specified in a progressive prescription. This is the add or additional power for near. In this case, the add is +2.00, which means that the total lens power in the reading portion of the lens will be +3.00 -.75 X 180.

digital surfacing and free-form digital surfacing. Traditional surfacing is the way the lens power has been put into the progressives since they were invented. Digital surfacing allows accuracy to 1/100th of a diopter (lens power) compared to 1/60th maximum with traditional lenses. They are fabricated using computer software to minimize aberrations and distortions inherent in the lenses. Free-form lenses are fabricated using digital technology as well, but may involve the front or back side of the lens, or both, depending on the prescription. In prescriptions over +/- 4.00 diopters, digitally surfaced, free-form lenses may have the best optics. But, of course, they are much more expensive.

A new lens technology called iZon is based upon wavefront analysis of each eye, and essentially provides high-definition vision in those of us who have higher order aberrations, or aberrations beyond simple nearsightedness, farsightedness or astigmatism, all of which are analog errors. It is the ultimate lens design for those who want the best possible acuity at any distance.

CHOOSING

I can't overstress the importance of confidence in your optometrist. Their guidance is the key to success with progressives. It's a team effort. The more clearly you state your expectations and demands, the more likely your optometrist can help you make the right choice.

In my opinion, you'll get the most objective care from an independent private practice optometrist, as compared to a chain store doctor. The mass retailers have directives as to which products to choose, and will not necessarily offer every option.

For a pilot, I always recommend anti-reflective coatings to reduce glare. This provides clearer, more comfortable vision in the cockpit, especially at night.

Sunglasses in progressive form can be either polarized or tinted. I recommend polarized for aircraft with acrylic windshields. Tempered glass creates distortions in polarized glasses, so if you fly a King Air or a Boeing 777, you need a tinted lenses. Polarized lenses may interfere with some digital displays, but only at certain angles of head tilt. I have never found that to be an issue, but you should test it with a cheap pair of polarized sunglasses before you invest.

Precise fitting is critical, and certain frame shapes and sizes work best with certain prescriptions and lens designs. Again, this is where your optometrist's expertise counts. I always recommend a frame with an adjustable nose pad for progressives, simply because the frame can be micro-adjusted to ensure proper placement of the lens fitting point after the lenses have been fabricated.

There is an inherent adjustment period, but if you're having trouble tell your optometrist. A simple adjustment may fix the problem. Occasionally, there is an error in measurement or fabrication, and occasionally the lenses must be re-made in this imperfect world. Keep working with it until it's right and you will be a happier, safer pilot.

In addition to being an optometrist and aircraft owner, Bob Glass is a pretty good musician. His offices are in Orange County, California.

AIRCRAFT FLIGHT TRIAL

Tecnam P2008: No-Apologies High End

And did we mention pricey? Although it's an LSA, Tecnam tilts toward designs that have more in common with Part 23 airplanes. They fly that way, too.

by Paul Bertorelli

CHECKLIST

- ⊕ Made in Italy and it shows in the styling and detailing.
- ⊕ Performance is at the upper range of LSAs for speed and range.
- ⊕ Interior and cabin is about as comfortable and well-appointed as these things get.
- ⊖ At $160,000 typical, many buyers may have second thoughts.

The relatively lackluster sales of new LSAs has proven one thing: There's not much room at the bottom of the market. Although there are sub-$100,000 LSAs out there, the top 10 sellers are above that price tier. Some are well above it.

And that's where Tecnam's newish P2008 comes in. The base price is $154,999, but equipped with the glass panel package most buyers would probably want, it invoices at about $170,000. Regardless of how would-be buyers might view this, the P2008 isn't a no-frills entry level LSA. If you want one of those, the Kitfox we reviewed in the December 2010 issue is a good starting place.

So what is the P2008 then? We view it as Cessna 172 or 177 writ small and, yes, cheaper. In case you haven't looked recently, 172s are retailing above $300,000, which makes the P2008 a little more than half the cost. It doesn't have the Skyhawk's capabilities, but buyers who wince at these prices tend to forget that new LSAs are far less expensive than new certified airplanes. Period.

Tecnam takes advantage of the 2008's composite fuselage construction with eye-pleasing curves.

TECNAM ROOTS

Tecnam's business experience dates to the 1940s (see sidebar on page 23) so it's not some faddish LSA upstart. This shows in how Tecnam products compare against other LSAs. In our September 2008 review of five LSAs, Tecnam's Sierra rose to the top as a definitive LSA because of construction quality, handling and overall value. The P2008 continues that tradition.

If the Sierra looks like a shrunken Tiger, the P2008 looks like an unsanforized Cessna Cardinal. It's a strutted, highwing design with the same rakish, stretched-out look that the Cardinal still has more than 40 years after it was introduced. The P2008 is mixed construction, with a composite fuselage and metal wings and Tecnam

The P2008's panel is big-airplane like, with a single Garmin G3X, a center stack and analog engine instruments to the far right. Fuel switch is plainly in view at the bottom of the stack, lower photo.

has taken advantage of that by sculpting in just enough curves to please the eye. It's not as wasp-waisted as Diamond's DA20, but neither is it as slab-sided as other LSAs and trainers.

Power is standard stuff, a Rotax 912ULS with a three-blade, fixed-pitch composite propeller. Despite the high wing and struts, the P2008 is impressively slick, given how quickly 100 horsepower accelerates it to cruise speed. There's nothing exceptional about the control system. It has a stabilator with an electric-only anti-servo tab, electric flaps and dual sticks.

What is exceptional (but ought not to be) is Tecnam's attention to how these things work together. The stick, for instance, is ergonomically crooked forward to stay out of your way during entry and in flight. It's also exactly the right length to rest a wrist on a knee while grasping the stick near the bottom. Not all LSA manufacturers get this not-that-subtle detail right.

Further, Tecnam also pays attention to the interior detailing. It's automotive like, with high-backed leather seats that slide on tracks for adjusting legroom and which also cant to get at the baggage compartment, which also has a hatrack. If this makes the thing sound as if it's intended as a traveling machine, it is. The front panel has a pair of large, automotive-style eyeball vents, but we found these hard to judge because in the demo we flew, the heater was slightly stuck on and the cabin was uncomfortably warm. We think the airplane could benefit from the inexpensive window vents many LSAs have and Tecnam will have those in the production version.

SYSTEMS

The P2008's fuel system is Cessna like. It has two integral wing tanks with a total capacity of 27.5 gallons. The tank switch is right up on the panel, below the radio stack, serving as a constant reminder about where the fuel is and how to get at it.

Given the Rotax's modest fuel burn, still-air endurance is about four hours, with reserves. Call that about 450 miles, which is about as long as any sane person wants to stay in an LSA.

Tecnam makes no apologies about the level of detailing and avionics available for the P2008, nor should they, since they are pitching for the upper strata of LSAdom. The seats are comfortably well-appointed leather and everywhere you look, the airplane has a finished appearance.

There are three avionics tiers. The basic one—which we surmise few will buy—is a traditional six-pack instrument package with a Garmin SL40 comm, GTX327 transponder and an aera560 GPS in an AirGizmo mount. That invoices at $154,999.

Stepping up to the Glass Panel Tourer package for $157,999 gives you an Advanced Flight System AD3500 EFIS in addition to the basic avionics in the starter package. Top of the line is called the Glass Panel Tourer De Lux, which adds an engine monitor and a Trio Pro Pilot autopilot. It sells for $169,999. You can also order custom packages, including the Garmin G3X, which was installed in the demo aircraft we flew. You can also have a Garmin 696, 695 or GNS430/530 combinations. A ballistic parachute is also on the options list. Without

AC TV

For a video demonstration of P2008, log on to www.avweb.com and select the video index. Scroll down to the Tecnam P2008 video flight trial link.

CONTACTS

Tecnam North America
877-359-4682
www.tecnam.net

trying too hard, you could drive the invoice to near $200,000.

FLYING IT

We're always relaxed about flying Tecnam airplanes because we know what to expect. That's not always the case with other LSAs, some of which have exceptionally light control forces that can lead to embarrassment on takeoffs and landings. Tecnam airplanes don't disappoint and the P2008 didn't.

With its high wing, it's a bit of a Cessna 150/152 experience, although the cabin is comfortably larger and better appointed. Our demo had the G3X and three back-up steam gauges immediately to the right. The airplane isn't approved for IFR and these aren't required, but Tecnam's Dave Lubore told us buyers tend to want them.

Ground handling is easy enough with differential braking and stabs at the rudder as the speed comes up. The airplane we flew, with the G3X, the backup gauges and a GNS430, had an empty weight of 840 pounds, leaving an LSA-typical 480-pound useful load. With two people aboard, there's payload left for 18 gallons. We suspect most owners will do what they are doing now: Top the tanks, put the people in and throw bags in the back for a 75-pound overgross takeoff. It's our duty to inform you that you're not supposed to do this even if the airplane will.

Thr Rotax 912ULS is easily accessible for preflight. The demo airplane had a removable cowl, but production versions have a split cowl. Center sticks, lower photo, have a deep forward crook to ease ingress/egress.

We were near gross for takeoff and the airplane rotated smoothly and transitioned to a brisk climb that put us at pattern altitude before the mid downwind. With their low stall speeds—41 knots Vso in the P2008—LSAs like to be flown slow, especially on final. In the P2008, that's not necessarily easy to do because it also likes to go fast.

In pattern work, we noticed it takes a hefty throttle pull to hold the airplane below 70 knots to arrive on a base leg at around 60 knots, with the flaps down. Having spent the previous day flying Cub clones, we noticed the P2008 is quite a bit slicker.

It's also child's play to land it if

continued on page 32

WHO ARE THESE GUYS?

Although it's among the top five sellers in the LSA segment, Tecnam is relatively unknown or at least misunderstood by many U.S. buyers. The reason for this may be that the company is—and forgive us for this—a real airplane company, not an LSA upstart.

Its antecedents extend to 1948, when it was formed by Italian aeronautical engineer Luigi Pascale, along with his brother, Giovanni, in the days after World War II when civil aviation was soon to enter a boom phase.

Pascale's company did something unusual: It survived, morphing through various names and iterations by producing a line of light GA aircraft for the training and military markets, including a 172-type model called the P66 Charlie. After a couple of acquisitions or sidesteps, the company morphed into what eventually became Costruzioni Aeronautiche Tecnam in 1986.

Unlike other LSA companies, Tecnam has a foot in the military and commercial aviation markets, making subassemblies for the Fiat/Alenia G222 military transport, the ATR42 and 72 and helicopter parts for the Agusta line. On the general aviation side, it has a mixed market of LSAs and traditionally certified aircraft. The P2002 Sierra is a popular LSA trainer—a low wing model reminiscent of the Czech Aircraft Works SportCruiser.

The P92 Eaglet is another highwing model, which has also found traction as a trainer. Another version of the P92 is called the Echo Classic. On the certified side, Tecnam has the P2006T, a twin uniquely powered by a pair of Rotax 912S engines. (See *Aviation Consumer* December 2009 for a review of the twin.) If the twin looks like a Partenavia P68, it should: Luigi Pascale designed both. His business efforts actually launched Partenavia, which was then acquired by Vulcanair.

The Tecnam factory is in Naples, Italy and Tecnam North America in Ashland, Virginia handles importation. This company is jointly owned by CEO Phil Solomon and Tommy and Kimberly Grimes and is an associate company of Heart of Virginia Aviation, an aircraft sales firm.

Cessna R182 Skylane

Fast enough for a retract with reasonable fuel consumption. Payload and range make up for any sins.

Mark Shilling's 1978 R182 cruises over Hells Canyon in the Cascades of Idaho.

Give the likes of new-age airplane companies like Cirrus and Diamond one thing: They have resisted the overwhelming urge to fit their airplanes with folding gear. But manufacturers of the 1960s and 1970s had no such resistance, including Cessna when it added retractable gear to the venerable 182.

Was the effort worth it? It did add about 15 knots of cruise speed without too much of a hit in fuel burn. But it also introduced a complex, maintenance-hungry gear system that owners say will work acceptably well if looked after. Owners generally like the airplane and it sold well initially from its introduction in 1978 until the bottom dropped out in the early 1980s. By 1986, the model was gone, along with the rest of Cessna's piston production.

The R182 delivers 15 more knots than the straight-leg model, without much of a fuel consumption hit.

MODEL HISTORY

Cessna introduced the R182 Skylane RG in 1978, making almost 600 of them that year. The total run, including the turbocharged version, would reach 2032 through 1986, when a mere nine were built before Cessna took a powder from the single-engine market. That's not many airplanes compared to all the M20 Mooneys or Bonanzas out there, so the choice on the used market isn't as wide as with straight-leg Skylanes. Prices of the newest models hover around the $100,000 mark.

To create the model, Cessna took the popular 182 and gave it a variation of the folding electro-hydraulic gear used on the 200-HP Cardinal RG, which had been introduced two years before. The R182 II Skylane RG (that's the correct type designation, not 182RG) got a bigger Lycoming than the 182's 230-HP Continental O-470; the retractable came with the Lycoming O-540-J3C5D, which required adding four inches to the length of the cowling.

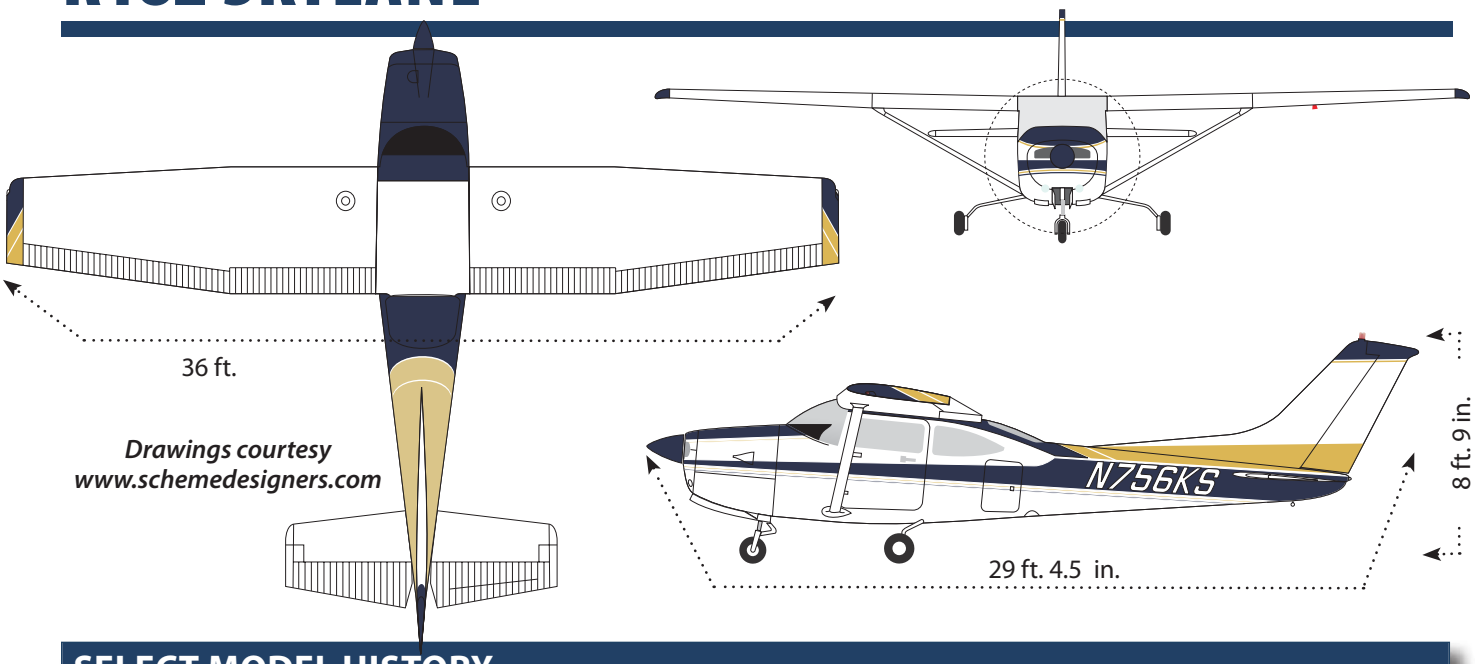
The turbo option was offered on the 1979 model, when Cessna first began building the line with integral fuel tanks instead of those troublesome bladders, which leaked and trapped water in wrinkles. The integral tank never needs resealing or repair. Some 727 R182s and TR182s or TurboR182 IIs were built that year. Fewer than half that number were built during the 1980 model year and the total fell off each year thereafter.

Aside from the switch from bladders after 1978, Cessna made only minor changes in the airplane through its eight-year run. The alternator and overvoltage sensor were swapped for an alternator control unit and the high-voltage warning light was switched to a low-voltage light in 1979.

The next year a new latch and pin system was introduced to reduce the notoriously drafty fit of the doors—there are two on the Skylane, which is as celebrated for its ease of entry and loading as it is reviled (or patiently accepted) for its so-called "gappy" Cessna construction and fit.

In 1980, an avionics cooling fan

R182 SKYLANE

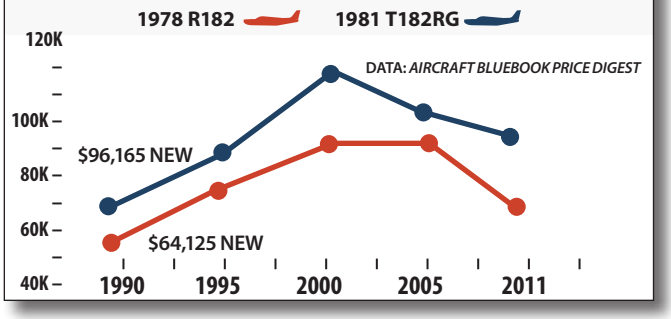


Drawings courtesy www.schemedesigners.com

SELECT MODEL HISTORY

MODEL YEAR	ENGINE	TBO	OVERHAUL	FUEL	USEFUL LOAD	CRUISE	TYPICAL RETAIL
1978-82 R182 II SKYLANE RG	LYC. 235-HP O-540-J3C5D	2000	$30,000	92	1290 LBS	156 KTS	±$72,000
1979 TURBO R182 II	LYC. 235-HP O-540-L3CD5	2000	$30,000	92	1254 LBS	173 KTS	$78,000
1983 SKYLANE RG II	LYC. 235-HP O-540-J3C5D	2000	$30,000	92	1254 LBS	156 KTS	±$72,000
1980-82 T-R182 RG II	LYC. 235-HP O-540-L3CD5	2000	$30,000	92	1254 LBS	173 KTS	±$80,000
1983 T-SKYLANE II	LYC. 235-HP O-540-L3CD5	2000	$30,000	92	1254 LBS	173 KTS	$96,000
1985-86 R182 RG B	LYC. 235-HP O-540-J3C5D	2000	$30,000	92	1290 LBS	156 KTS	±$105,000
1984-86 T-R 182 RG B	LYC. 235-HP O-540-L3CD5	2000	$30,000	92	1254 LBS	173 KTS	±$115,000

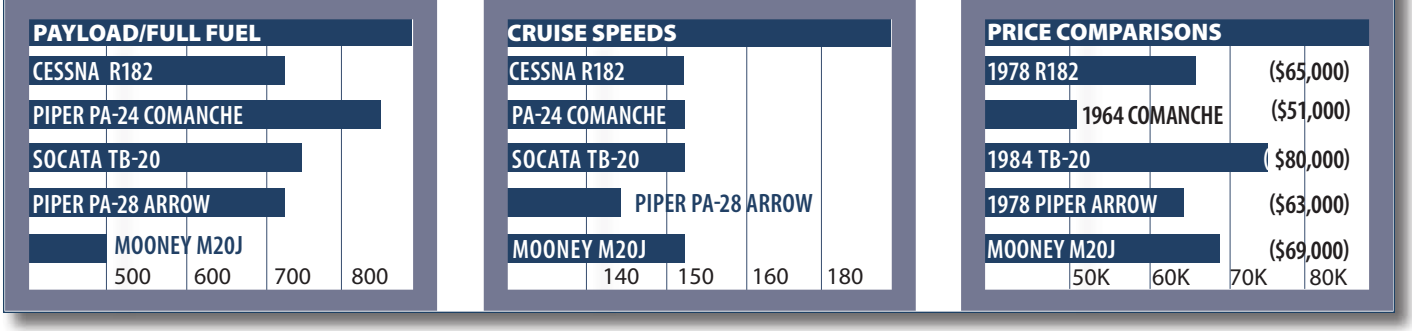
RESALE VALUES



SELECT RECENT ADs

AD 05-19-11	LYCOMING 540 CRANKSHAFT
AD 00-06-01	FUEL STRAINER ASSEMBLY
AD 87-10-6	ROCKER ARM ASSEMBLY
AD 84-10-01	WATER IN BLADDERS (1978 ONLY)
AD-83-13-01	LEAKING FUEL CAPS

SELECT MODEL COMPARISONS



Like its straight-leg stablemate, the R182 needs to be trimmed properly on final approach to minimize the risk of a nose-first touchdown. (Photo: Marc Ulm.)

became standard and the oil cooler was relocated from the left forward baffle to the firewall. Also, the battery was moved from the firewall to the less hostile environment of the tail cone, where access is also easier. A new muffler for better cabin heating, especially in the rear seats, addressed another Skylane complaint.

In 1983, Cessna replaced the amber gear-up light, which stayed on if the gear did not lock down, with a red gear-in-transit light, which stayed on whenever the gear motor was running.

With the gear tucked up, the Skylane will build up speed when the nose drops. It helps that the first 10 degrees of flaps can extend at 140 knots. In 1983, Cessna beefed up the flaps further so they can be lowered to 20 degrees at up to 120 knots.

The wing root ventilators were redesigned in 1980, but they are known for getting loose with age, spraying water into the cockpit in rain and popping open all by themselves. Duct tape over the wing inlets is the standard field solution.

Skylane windshields also tend to leak and the R/TR182 is no exception. The only solution that works is removing the windshield and resealing it. Watch for shops that use silicone sealant instead of the proper felt stripping. Windshields expand and contract; hardened silicone does not.

The R/TR182 has no main gear doors. But it does have nosegear doors and early on they occasionally caught the cowling skin and got stuck. A 1983 redesign addressed the problem. In 1984, the airplane got new composite fuel caps and rear-seat shoulder harnesses as standard equipment. Dual controls became standard instead of optional that year, but who's seen any single-control Skylane RGs around?

PERFORMANCE

The Skylane retractable is a solid cross-country airplane with a 150-knot cruise commonly reported at a fuel burn of 12 to 14 GPH. With its 88-gallon usable standard tanks (on 1979 and later models), it can go far. Its range and its 1200- to 1300-pound useful load give it lots of flexibility as a good hauler.

Those big tanks, which provide better range than early Mooneys and Bonanzas, leave less of a useful load than a 250-HP Piper Comanche with full tanks—but that comparison doesn't do justice to the airplane's flexibility.

With full fuel, four FAA grownups can go on a long trip—close to 1000 miles—and share a single overnight bag. Fly with less fuel and you can carry just about anything you can fit into the airplane and still fly for hours. We've said it before and can't resist saying it again: Your bladder can't last as long as the fuel supply when you cruise an R182 at lower power settings, say 55 to 60 percent.

Another big attraction is that the R182, with its big, fat wing, big flaps, high flap extension speeds and good prop clearance, is just as handy getting into and out of smaller airports and rougher fields as it is keeping up the speed on the ILS into a Class Bravo airport, even as it drops full flaps at the last minute and gets out of the way at the first turnoff.

Try that in a Mooney. A few owners do complain, however, that because the tires on the RG are smaller and inflated to higher pressures than those on the fixed-gear Skylane, it can be a little squirrelly in crosswinds and harder to control on the runway.

Its 235 horses also take some pilots by surprise when they pour on the coal: A Mooney or Arrow pilot used to 200 HP might be surprised by the left-turning tendency of the Skylane RG at full power and high pitch. These traits, and the heaviness of the elevator, may explain a number of runway and go-around crack-ups over the years.

Comparisons are not made between the R182 and the Bonanza, which pilots do not consider a lower-priced choice in the used market. So *Aviation Consumer* a few years ago conducted a side-by-side flyoff between the R182 and a 201. It found the R182 had the better climb rate and more dexterity getting into and out of a variety of airports. The Cessna hauled more, both in weight and volume, and was a little faster than the sleek 201, but of course at 20 to 40 percent more gallons per hour.

The turbocharged version is significantly faster after its easy climb into the low teens, where it can achieve 165 knots TAS and more at higher altitudes. The normally aspirated R182 climbs well, too, with 1000 FPM typical at lower altitudes at gross weight and standard temperature. The turbo, its adoring pilots have told us, will lope up to FL 200 at 1000 FPM the whole way up.

HANDLING, CABIN

In the air, the 182RG is a gentle, forgiving beast with a solid ride and feel.

An *Avcon* writer used it to practice airwork for his CFI certificate and found it gentler than a 172, unwilling to bite even in a fully cross-controlled stall. Still, it requires some skill to fly well. It is not a feet-on-the-floor airplane like the Cherokee and its derivatives.

Pilots who don't use as much rudder to help roll out of a turn as they used rolling in will wallow all over the sky. (They never seem to notice how far the ball slid outside the cage.) The RG likewise needs nimble and firm rudder work on and near the runway to keep the nose straight on takeoff and in crosswinds.

Most notorious is the heavy elevator feel, something you'd expect pulling back on a DC-3 yoke. The heavy pitch and the Skylane's brick-like descent rate with full flaps and gear out—something you'd expect of the Space Shuttle—have led to a fair number of hard landings and runway loss-of-control accidents. Don't try to land power-off with full flaps; the timing of the roundout and flare will be so critical as to invite a hit or a drop. Keep some power in. Watch out especially for forward-CG landings, with full fuel and only two aboard in the front seats. And before buying a used Skylane RG, check the logs, gear and the firewall carefully for evidence of damage.

The Skylane cabin is famously roomy and easy to access with a wide door on each side and windows that open on both, in most models. The baggage door is low to the ground and convenient. That big box of a cabin, however, flexes and the door and windshield fit can get sloppy over the years. That makes for drafts and water leaks. The original seats are okay except for their cheesy plastic and fabric. They are adjustable in height and seatback angle with lots of parts and pieces. Watch out for broken adjusters as well as worn seat tracks, the subject of a well-known AD affecting many Cessna singles.

MAINTENANCE

A look at the past Service Difficulty Reports confirms that landing gear malfunctions and problems continue to top the list of R/RT182 maintenance woes. Out of 73 SDRs submitted between 2000 and 2010, 20 percent had to do with sheared bolts, failed downlock pins, cracked pivot assemblies, stuck doors and the like in the gear system, a figure consistent with the last time we looked.

Although 20 percent of Service Difficulty Reports show problems with the landing gear, owners don't seem to complain about it much. In lower photo, Mark Shilling's R182 gets a gear swing. (Top photo: Gustavo Carujo.)

Owners who wrote us recently had no serious complaints about the gear. Pilots who know how to avoid hard landings, we suspect, probably have landing gear systems that work just fine (as long as a previous owner's mistakes have been properly repaired).

The next most common issues found in the SDRs were engine issues of various sorts, including worn or stuck valves, magneto woes and carburetor trouble. This pattern hasn't changed much over the years.

Other complaints over the years have included instrument lights that flicker out, leaks around the windshield and wing root, turbos leaking oil, shearing vacuum pump drive shafts, poorly aligned aileron hinge cotter key holes, failing Bendix starters, cracked exhaust stacks and worn alternator mount bolts.

Be aware that in the past, the RT182 had more than its share of bugaboos. Recent history and owner comments suggest, however, that at least some of the old RG problems have been ironed out. There have been no ADs specific to the RG series in recent years.

MODS, OWNER GROUP

The Cessna Pilots Association is a great source of information for all Cessna owners. A membership is $55. Visit www.cessna.org to sign up. AOPA's member section (www.aopa.org/) has a great summary of the hundreds of mods available for the Skylane, some of which can be applied to the RG series, including kits for drag reduction, STOL performance, replacement tanks, and caps for the 1978 bladders, and caps

ACCIDENT SCAN : HEAD UP AND LOCKED

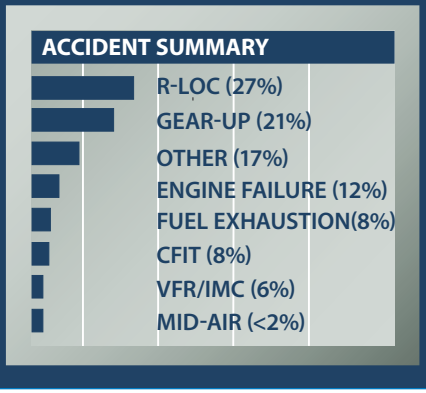
Although readers tell us that the R182's landing gear is fine and doesn't represent a problem, the NTSB's accident records tell a different story.

Of 72 accidents we reviewed, 15 or 21 percent involved gear-up landings of some kind. Some were single-leg collapses on the runway, some were failure to extend and one appeared to be an accidental retraction.

Seven of the total appeared to be maintenance or mechanical=failure related, such as uplock failures, hose leaks or motor failures. The rest were of the I-forgot-about-it-nature. This is the highest incidence of gear-involved accidents we've seen in any aircraft model.

As with most models, runway loss of control leads the league as a major accident cause. Only one or two of these seemed to be the Skylane's classic bugaboo—the nose-first touchdown. The rest were the usual mayhem, including losing it in crosswinds, excursions into the tules and just running into stuff, as pilots of all types seem wont to do.

Among the engine failures we found, the turbcharged models were more frequently involved and, in several cases, involved exhaust system failure. One was a crankshaft failure. Interestingly, there were few if any stall/spin accidents.



and backup vacuum and electrical systems. Well-respected speed mods come from Horton STOLcraft in Wellington, Kansas (800-835-2051 and www.hortonstackdoor.com) and Knots 2U, Ltd. of Burlington, Wisconsin (262-763-5100, www.knots2u.com). If there are still RGs out there with the old bladders, Monarch Air and Development, Inc. in Oakland, Oregon, has the fix (541-459-2056, www.airsport.com).

READER FEEDBACK

The Paramus Flying Club has owned and operated a 1979 Cessna 182 RG since 2003. The members collectively log around 200 hours a year on this aircraft.

Despite its higher cost, a handful of members prefer this aircraft to all others in the fleet. They cite its speed, its power and the safety margin that that provides, and its versatility as primary factors.

With retractable gear, the 182RG is a full 15 knots faster than our fixed-gear 182. And with 88-gallon tanks and 1200 pounds-plus useful load, this is indeed a very versatile aircraft. Members also note the intangibles—one pilot noted the "unmistakable growl coming from under the cowl" while another opined that somehow "this feels more like a real plane—maybe it's the raising and lowering of the gear."

As might be expected, control forces are much heavier than a Cessna 172. Proper trim is critical to flying this aircraft well. And executing maneuvers where trim adjustment is not practical, or go arounds with the airplane set to landing trim, require quite a bit of muscle. As with all Cessna 182s, the RG feels nose heavy, especially in the flare, which can lead to bounced landings or worse if one is not careful.

On the plus side, the inertia of the heavier aircraft makes for a more pleasant ride and a better instrument platform. Members also note that the 182RG makes a great training platform for those looking to move up to bigger and faster complex aircraft.

The cost of annual inspections have been consistently around $4500 to $5000 over the last five years. We allow for an additional $6000 to $8000 per year for other maintenance—oil changes, 100-hour inspections, the inevitable repairs and so on. Insurance is expensive but still possible to get even in a club environment, although it does come with experience, training and currency requirements. On the plus side, time in the 182RG has made it easier for some of our members moving up to bigger aircraft to get insurance.

Overall, the operating cost for the aircraft is about $145 per tach hour—-$70 for gas and oil changes, $50 for maintenance (excluding annual), and $25 for reserves (engine overhaul at TBO, paint, etc.).

As might be expected of an aircraft of this vintage, there have been a number of maintenance issues. Like many 182s, ours drains the left tank first even with the fuel switch set to both. The transponder had to be relocated—proximity to the heat vent ducting was causing it to overheat and malfunction. A persistent nose-gear shimmy was ultimately traced to a faulty nose gear bungee, which was in turn damaging the rivets holding the nose gear assembly. Left unrepaired, this could have resulted in a nose gear collapse. (We corrected this, but only after a number of expensive false starts, which included a shimmy-damper replacement which may not have been necessary.)

Most seriously, the aircraft began leaking exhaust into the cabin, tripping CO monitors on several occasions. After a lengthy investigation involving two shops, the problem was remedied. However, why the problem suddenly developed was never explained. Finally, the factory original autopilot has been inop for a while now, and will need to be replaced.

Nevertheless, our 182RG has been a rock solid and predictable performer, taking on whatever our members can throw at it—from local weekend getaways, to commercial certificate training, and long-haul cross country trips. It even went to help out in the relief effort in Haiti, where it performed like a champ in the warm tropical environment ferrying personnel and supplies over the 10,000 foot Central Range of Hispaniola.

Tomoharu Nishino
Paramus Flying Club

In 1981, I sold my Cessna 172 and purchased a 1978 Cessna 182RG for $36,000 so I could fly IFR for business travel, and until recently, I never found reason to trade up (that is 29

Panel design is typical Cessna. Given the generous real estate, 182 panels are a good platform for glass upgrades. Mark Daniels has had his 1978 model, above, since 1981.

years in the same airplane!).

Now my use is primarily family travel and a 182RG fits the mission because it carries 780 pounds with full fuel. I can fly my family of four with lots of luggage, or two couples with light baggage. With the backseat removed, the cargo area is impressive with a nearly flat floor stretching from the front seats to the baggage compartment.

I've carried firewood, bags of crawfish, sculpture, industrial test equipment and a small surfboard. Two passenger doors are a bit high and awkward for the uninitiated, but this arrangement is still much better than walking on the wing. Plus the high wings provide a roof for loading in the rain.

The aircraft typically flies 150 to 155 KTAS at 4000 to 6000 feet and 140 to 145 KTAS at 10,000 to 12,000 feet. I've been up briefly to 14,000 feet, but it gets pretty sloppy. At 70 percent power, fuel consumption is 12 to 13 GPH at 50 degrees rich of peak.

The fuel bladders were replaced when they were about 10 years old, but I've had no leaks since then. Fuel capacity is adequate for the size of my personal bladder. I plan maximum 4.7-hour legs.

Dispatch reliability has been very good, with only one trip postponed due to an oil leak in the cabin on departure because of a hole in the oil pressure gauge line (that was exciting). I usually put it in the shop for repairs once or twice a year. Annual inspections run from $2100 to $3000 (up from $500 in 1982). Repair and maintenance costs average $2100 per year over the last eight years.

The original engine went to 2000 hours TBO without a top overhaul or any other major work. The overhaul (1992) cost was $15,500, including engine balance, battery, prop, carburetor, exhaust system, magneto, fuel pump and vacuum pump. I'm on the second engine and it looks likely to go the distance, too, despite spending a lot of time in the hangar for a few years.

I'm a born skeptic, but in 2001, I installed a plug to let me use an IES DeSulfator battery conditioner whenever the airplane is in the hangar. The result is that the life of the pricey 24-volt batteries has improved two- or three-fold. Now I'm a believer. I had to pump the gear down by hand once and that was fixed simply by replacing the hydraulic pump motor brushes. Parts are readily available except for one 30-day delay for a Cessna made to order hydraulic line.

The airplane is a stable IFR plat-

form and a few inadvertent and scary encounters with ice yielded no bad handling characteristics. The plastic interior trim is painfully fragile when it gets old, but replacement is not a big deal. Insurance cost is about $1200/year for $1 million liability, $100,000/passenger, $91,000 hull.

In summary, this model provides a respectable speed, good reliability and impressive cabin load capacity for a reasonable acquisition cost. More important, operation costs are reasonable. It does not have the snazzy look of a Bonanza, Arrow, or Mooney, but for my money, it provides the best value on the performance vs. cost curve. If a general aviation plane can be called practical, this is the one.

Marc McDaniel
Via e-mail

I have been the owner of a 1978 Cessna R182 for 40 months as of February 2011. I have been pleased with the selection of the R182. First, it handles big and tall people well. I am seven-feet tall and over 270 pounds. It has great head and shoulder room for the front row. It has very good load-hauling capacity. I almost never have to worry about weight and balance.

My expenses for maintenance the first year were $7724, second year $6198 and third year $5270. These maintenance costs include my annuals, which alone are about $2800. These numbers do not include an engine reserve.

My insurance for this fourth year will be $1357 for $1 million/$100,000 with a hull value of $115,000. I have 558 hours total and 471 hours in the R182. I upgraded to a Garmin 530W, GTX330, Century NSD360 HSI and digital encoder, and plan to do more upgrades over the next several years.

The R182 flies well. It does not taxi well, probably due in part to its relatively small tires. But I did not buy an airplane to drive. The small tires make it harder to steer than many singles, but you get used to it. I have a Horton STOL kit, so my stall speed dirty can be as low as 37 knots. At first, the nose-heaviness was something to get used to, as I had a harder time "slicking" my landings. But now, it's almost second nature.

It had two gear-up landings before I bought it, by the first owner, but you would never know, except for the documentation. My R182 had a factory remanufactured Lycoming O-540 with just 65 hours on it when I bought it. I use Aeroshell 80W in the winter with a pint of ASL Camguard, and Aeroshell 100W in the summer, also with Camguard. Due to its short/soft field performance, I enjoy visiting many grass landing strips.

My R182 is on its fourth prop control cable since 1978. It's not a major expense, but it's about one new prop control cable every eight years. That's too frequent. Cessna had me file a Product Condition Report. I have not heard a response. They claimed it had nothing to do with the fact my cable passes near the engine exhausts, which I hear can melt the Teflon coating inside the cable. Cessna has an updated design which re-routes the cable over the top of the engine and not below it, which they say is just an ease of operation concern.

It's three times the cost. If my new prop cable can't make it more than 10 years, I'll get the MacFarlane part or switch to the new service kit. For my R182, parts availability is wide. Membership in a club like Cessna Pilots Association is a must. The parts locators and resources connected on this website are invaluable.

Todd Fuller
Charlotte, North Carolina

I bought a 1981 TR182 in 2006. After five years of ownership, I have concluded that this aircraft is the best tricycle 100 series Cessna has ever built. I was fortunate to buy from a gentleman who put it in perfect condition before I bought it, making my ownership experience very economical. Changing the oil and filter on this model is very easy and can be done by removing just the passenger's side upper cowl.

An owner can change the oil and filter in jig time, since the filter and oil drain are so accessible. Annuals and associated minor repairs inevitably found at each annual have been $2000 or less, not including my optional upgrades. Insurance for a hull value of $130,000, hangared, has been about $1200 per year. The gear has been absolutely trouble free. Gear-related expenses have been zero. The first upgrade I added was a JPI engine monitor with TIT and fuel flow. It is the singular most valuable and important upgrade I have ever done and critical for proper operation of this bird, in my opinion. I quickly found out that my CHTs were way too high due to old and partially functioning baffles. Replacement of all my flexible baffles solved this problem along with a modification of the metal baffle on number 1, which took that hot cylinder from hottest to fourth warmest.

I have gone through the ignition system, IRANed the mags, checked resistance in the wiring harness and replaced the coiled spark plug leads on all six cylinders, plus replaced all the plugs with new Unison massives. After this maintenance, my cruise fuel flow was reduced by 1.5 GPH for the same speed. I cruise at 60 to 65 percent power setting with the prop pulled back to the bottom of the green, leaned to peak TIT or, when conditions permit, 10 degrees lean of peak. This yields 150-knots at a fuel flow of 10.5 GPH at 9500 to 11,500 feet. This gives you an amazing (no reserve) range of about 1300 statute miles on 88 gallons of usable fuel. Leaning to best power at the same altitudes gives speeds of 165 knots with higher fuel burns.

TR182s have factory-installed oxygen systems which make high-altitude cruising a convenient matter of just plugging into the overhead oxygen ports. This ship will cruise over 20,000 feet at 200 MPH. My bird has a useful load of 1100 pounds, so with full fuel, two adults and two kids, plus some bags, we can get halfway across the country.

The TR182s are factory turbonormalized, possibly the first turbonormalized factory set up in the industry at the time. The TR versions were only produced from 1979 to 1986, so they are more rare than fixed-gear 182s of the same vintage. The turbo setup is simple. The wastegate is manual with a straightforward mechanical linkage which needs minimum maintenance—mostly lubing, but it does require the pilot to understand and be aware how it works.

The POH does not explain proper operation well. Any owner should join the Cessna Pilots Association to learn more about the proper opera-

tion of this capable aircraft. It's too bad Cessna doesn't bring this excellent design back into current production. It is a versatile, economical and fast strutted-Cessna with a trouble-free gear system. Virtually every A&P can work on it. Maintenance, insurance and operating costs are very economical for a retract. I think I may just keep mine forever.

J. Hurst
Tahoe City, California

I have owned my 1978 R182 for six years and 850 hours now. In my opinion, there is no better GA aircraft built by Cessna and may even be the best all-around airplane in the fleet.

The airplane has been reliable, reasonably fast, economical, roomy, stable, virtually immune to loading out of CG and can carry a serious load. With full fuel (74 gallons) I can carry 800 pounds in the cabin at 150 to 155 knots on 13 GPH. I used to have a 180-HP 172 and on a trip, the R182 uses the same amount of fuel, but arrives much faster and more comfortably.

The landing gear has had a bad rap in the past, but properly maintained it is great. There are only two hoses in the gear system and the rest is hard piped. The actuators get rebuilt every six years, which consists of replacing O-rings and seals and flushing the hydraulic fluid. Properly maintained, the system is as trouble free as any retract. The engine is the reliable O-540 rated at 235 HP and with proper maintenance on the engine will easily go to TBO.

There is room in the cabin for four people and the comfort is better than most GA airplanes. Two doors helps entry and exit from the plane.

It is a great IFR platform and heavy on the controls, especially pitch. It is not unusual for me to leave North Carolina, fly to Pennsylvania or Georgia for a business meeting, and return in time for dinner at home. It is a great traveling machine.

This airplane is not as numerous as others in the fleet and will compare well to Mooneys, Comanche 260s and Bonanzas. With the current values of these airplanes, they are a true bargain in the market.

Mark Shilling
via e-mail

Letters

(continued from page 3)

SR22. It is clear that you have been enamored with the Cirrus, but I have come to expect very candid reporting from you rather than thinly veiled marketing.

I have been seeing a lot of Cirrus fatalities in the news so I decided to do some research on my own on just to see how safe the parachute, G1000 Perspective and level button actually are and it is quite shocking.

From the FAA registry, there are 3803 certified Cirruses on the registry and the NTSB reported 68 fatal accidents. To get a fatal accident rate, I divided the total number of airplanes by accidents and was disturbed to find that one out of 56 Cirrus airplanes have been in fatal accidents. Now, I don't know about you, but that number scares the heck out of me, especially for an airplane that is often professionally flown by trained crew on routine business-type flights.

To be fair and to compare Cirrus against the airplane that is often mistaken for Cirrus, I compared Cirrus numbers against the Columbia/Cessna 350 and 400 (LC42 and LC41, respectively) and came up with a total of 674 registered airplanes and only five fatal accidents. Again, to be clear, what I feel is important is the rate of accidents and the Columbia/Cessna composite aircraft fatality rate is 1/135. In other words, despite the parachute, the G1000 Perspective, the level button and the frequent professional crew, the Cirrus is 250 percent more fatal than the Columbia/Cessna composite aircraft that is flown with similar utilization on business-type missions.

Personally, I wouldn't get into an airplane that killed one out of 56 of its pilots, yet this airplane is generally accepted as "safe," and that disturbs me.

I don't buy into the "those pilots are different" philosophy attributing that kind of fatality disparity to the pilots, nor do I buy into the claim that the airplane is flown on different missions or utilization with respect to the Columbia/Cessna

continued on page 32

The Aviation Consumer

Tecnam P2008

(continued from page 23)

you're on speed. A perfect squeaker is easy on the first try because the sight picture over the nose is good and control forces are certified-airplane like, not LSA twitchy. Pitch is light, but not too light. One disconcerting thing we did notice is a noticeable buffet with full flaps down. It feels like a stall buffet, but with the nose pointed down and 65 knots indicated, that's clearly not the case. Tecnam's Lubore told us the factory is working on a tailfeather fix to eliminate the buffet.

There's hardly any pitch change on flap deployment and stalls are what you'd expect from a Cessna 150. Actually, maybe a little less than you'd expect. A 150 will break without much effort but the P2008 has to be pushed to show a break. (We guess, we couldn't get it to break.) It's happy doing parachute mode with the airspeed indicator close to the zero peg.

At the other end of the scale, the P2008 is toward the top of the LSA spectrum in cruise speed. We recorded 114 knots true at 4000 feet burning about 5 GPH. Measured noise level in the cabin is below 94 dB.

CONCLUSION

Who's this airplane for? Probably not many flightschools, given its price. So Tecnam rightly has it pegged as a sport cruiser/go places airplane, which it certainly is. Too bad it's not IFR legal because we think the airplane is perfectly capable of light weather flying. Otherwise, many an owner will spend a frustrating day or two on the ramp looking at his $170,000 grounded toy. This is something we wish ASTM and FAA would address. For the P2008, Tecnam will likely need a mix of full-circle pilots stepping down from twins and high-performance singles and moneyed buyers who want to go a little faster in a little more comfort, but to whom IFR isn't important.

That's exactly what the P2008 does and it comes from a long-established company, not one building a single LSA model. That's a plus, in our view. We're not sure how many such buyers there are, but Tecnam's got the airplane for those interested.

Letters

(continued from page 31)

composites. Cirrus has undeniably spectacular marketing and sold the FAA (and *Aviation Consumer*) on a "comparable level of safety," but let me personally challenge you to test that assertion.

If you go on blindly reiterating the marketing and not doing your homework you directly contribute to the continuing malaise of general aviation and specifically against what your publication (and sister publication *Aviation Safety*) claim to promote—namely the safety, intelligence and general welfare of your readers.

Eric Neeb
Boulder, Colorado

We didn't "blindly accept" Cirrus marketing claims. We did our own investigation which examined the Cirrus accident pattern the correct way—by rate measured against exposure. Because reliable fleet hours data is difficult to come by, we relied on a combination of our own estimates, Cirrus data and data from owners.

We found that the Cirrus fatal accident rate—and the percentage of Cirrus accidents that are fatal—is a bit higher than the GA average. We calculated about 1.6/100,000, versus about 1.2 for the rest of GA. The SR22's overall accident rate appears to be about average in the 6.2/100,000 range.

It is true that the Cirrus accidents per registrations is high, but this method of accident ranking is blind to exposure and thus limited.

Furthermore, we don't accept the notion that the Cirrus is often flown by professional pilots. It is predominantly an owner-flown airplane, in our view. In a future article, we'll take another look at Cirrus stats.

FEEDBACK WANTED

TWIN COMANCHE

For the July 2011 issue of *Aviation Consumer*, our Used Aircraft Guide will be on the Twin Comanche, a popular light twin. We want to know what it's like to own these practical twins, 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 Twin Comanche by May 1, 2011, to:

Aviation Consumer
7820 Holiday Drive South
Suite 315
Sarasota, FL 34231
(preferred) e-mail at:
avconsumer@comcast.net