November 2010
Volume XL
Number 11

The consumer resource for pilots and aircraft owners

The Aviation Consumer®

Expedition E350

Bush performance in a refined package … page 4

MVP-50 monitor … page 11

Hold it right there … page 17

V-tail Bonanza … page 24

8 AIRCRAFT LOANS
Interest rates are as low as they've been in decades

11 EI'S MVP-50
It's like a mini glass cockpit for your engine

14 NAV DATA CRISIS
Will emerging competition bring prices down?

17 GPS MOUNT GADGETS
RAM rules the world, but AirGizmo is making inroads

20 GLASS FOR LSAs
Yes, it's worth the additional expense

24 USED V-TAIL BONANZAS
A classic high-performance single that still sets the pace

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

Big Upgrades: Reward and Risk

This month's coverage on the Electronics International MVP-50 reveals an inflection point in glass upgrades for older airplanes. This is it: Even three years ago, if you really wanted to deck out a legacy airframe in full glass, you couldn't quite get there. You still had to fool around with analog or steam gauges for the power and system instruments or, if you didn't, the digital replacement choices were limited.

They aren't now. Between JPI, EI and Flightline Systems, there are plenty of options for replacing analog gauges with electronics. And the new stuff isn't just a pretty face on the old gauges. These devices do more, they provide more accurate information and they are, in short, just better.

The MVP-50 I reviewed for this issue was installed in a Cessna 210 that was getting a Garmin G600 and an S-TEC autopilot. These products are a great leap forward for a 35-year-old airplane and substantially improve on the experience of IFR flight.

There's easily room for the ADS-B requirement when that comes due in 10 years. But in the decade ahead, new products will emerge to address that requirement, so there's not much point in worrying about it now.

So what is worth worrying about? The long-term value of the investment that a full glass conversion represents in a legacy airplane like a 210 or Saratoga. I'm worried that some owners are still asleep on the fuel issue and are too willing to believe the don't-worry-be-happy boilerplate coming out of the alphabets, who still aren't confronting this issue realistically and addressing their members as adults capable of making their own risk assessments. In other words, in judging how the value of your airplane may be impacted, you are best advised to rely on your own information gathering from multiple sources, not just AOPA, EAA and others.

Recently, AOPA launched an informational campaign to both inform its members about the avgas issue and, apparently, tamp down what it sees as potential panic. It's good that the association is waking up and getting busy and noting to its members that it actually has been engaged all along, albeit not overtly. But its coverage lacks inside baseball interpretation. When the going gets complicated or political, AOPA tends toward the banal: Don't worry, this is complicated, but we've got it. OK, so that's their job.

But it's not mine. What the alphabets don't accept is that even though the avgas termination date may be seven years off, owners will start to get nervous long before that if they don't have a replacement fuel in sight. This will directly impact two things: the value of an expensively modified airplane that requires 100-octane and the ability to sell it if the market gets volatile.

What to do? By all means read everything AOPA is doing on fuel coverage. It's good basic information and I give them credit for at least trying to get the tone right. Second, hook up with the 100 Octane Coalition (www.100octaneformyplane.com). This group is doing what the alphabets are not: taking an active, market position to represent demand for a specific performance fuel—a 100-octane equivalent. They've become a good source for real-world assessment of the evolving fuel worry.

And by the way, I've been repeatedly asked if I'd spend money on these expensive upgrades or an engine overhaul considering the fuel overhang. My answer is yes, I would. But I've got my eye on that timeline. You should, too.

—Paul Bertorelli

Ditching Déjà Vu

Enjoyed the ditching training article in the September 2010 issue. Took me back 70 years to my Navy pilot training at Pensacola and the feared Dilbert Dunker we all had to experience.

A few things I might add as advice for anyone needing to ditch is:

- Do it well off shore, where the water is deep enough so that if you turn upside down, there is enough space to drop out.
- Open a door or canopy before you hit.
- Shed your shoes if possible while in the air.
- Long pants, as the Navy teaches, can become a flotation device. Knot the ends, swoop through the air to trap air—the wetter they get, the better they hold air. You have to keep doing it.

Thanks for helping me recall nearly 70 years ago.

Howie Keefe
Mulberry, Florida

Diesel Numbers

I have read your article on aircraft diesels, but am a bit puzzled since I cannot relate to our reality in Europe. For example, here in northern Sweden, the price of avgas 100LL is roughly about double that of Jet A. This means that in our club, we fly our very fine and powerful Cessna 182 SMA for about the same price per hour as our old PA-28-161.

Besides, for almost two years the SMA has performed excellent, significantly better than the factory figures which obviously are very conservative. (We did not even consider the Thielert as an option since, in our view, is not an aviation engine.)

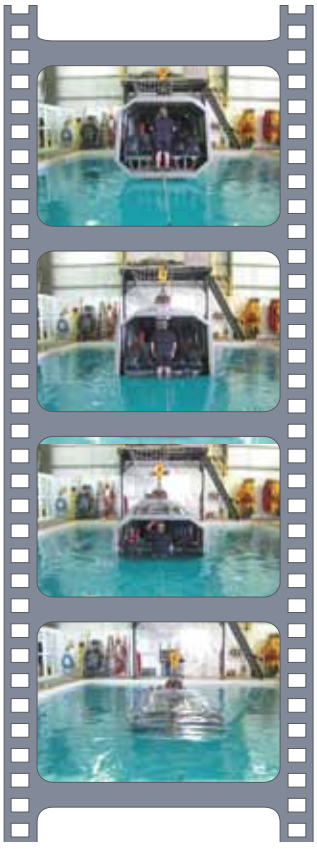
I think you should have mentioned the completely different price pattern of aviation fuel in Europe compared to the U.S. when you discussed the economy of diesels.

You are still right about the problems with low volumes of diesels on the market, which makes service rather rare in northern Europe.

Stellan Nilsson
Via e-mail

Borescope Query

I have read a lot about the value of doing a borescope to gather information when troubleshooting maintenance issues, before pulling a cylinder. However, many shops don't have one, and I am considering getting my own that I could supply to whatever shop is working on my aircraft.



Checking with Aircraft Spruce, these seem to be in three price ranges: $200 to $300, $800 and $1800 to $2000. I can't tell the difference for this application just from the descriptions. It would be very useful if you could do a short review of options for private acquisition of a borescope, especially for cylinder checking, but also other uses on the aircraft.

Vince Fischer
Via e-mail

Our colleague Kim Santerre, editor of Light Plane Maintenance, *tells us that low-cost borescopes won't do the job. He recommends the Hawkeye by Gradient Lens Corp. as the best option, either solid or flex. With the attachments, it will cost about $1000. This is the lowest-cost practical scope for cylinders.*

Headset Headache

Thanks for the great review of noise-cancelling headsets in the September issue. I own older versions of Bose, David Clark and Lightspeed ANR headsets and I'm looking forward to a new one because the Bose broke at a critical plastic part. The headset was fairly old, but had minimal use—maybe a couple of dozen times. I suspect that the plastic may have deteriorated due to the temperatures here in Arizona.

I contacted the factory and they insisted that they needed to "rebuild" the headset for a substantial chunk of the retail price, instead of just replacing the part. I know that Bose is having to cut back during the recent economic unpleasantness, but this policy stands in sharp contrast to David Clark, which not only repaired a broken part for free, but paid for the shipping.

Performance is important, but standing behind the product for the long term can be a deciding factor for me. I have several other Bose products, but I won't be adding to them in the future.

Miller McPherson
Cascabel, Arizona

LED Legality

I own a production 1979 Piper Archer II. My landing light reminds me of what a 90-year old must see with his glasses off. Because there is no STC for the Whelen Parmetheus yet, that means I cannot install it correct? I just got my airplane this summer

continued on page 32

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

Expedition E350: A Refined Workhorse

The descendant of the capable Bush Hawk XP, the E350 caters to owners who require backcountry performance without sacrificing comfort.

by Jeff Van West

CHECKLIST

- Terrific load-hauling and short-field performance, with respectable cruise.
- Well thought out and versatile cabin design.
- Stable company with a loyal, if small, following.

Every aircraft design has an underlying mission it's designed to and best suited for. Human owners rarely have so narrow a need, however, so one of the greatest challenge of choosing an aircraft to own is finding a design whose perfect mission falls in the fat part of the bell curve for the range of missions you plan to fly.

Expedition Aircraft's E350 is a backcountry load-hauler first and foremost; it's a big crate with a fat wing and gobs of power. Load it up with the full 100 gallons of fuel and you can still toss in another 800 pounds of payload. That 3800-pound-gross-weight airplane will be off the ground in about 800 feet and climb at 1000 FPM. At 155 knots and 17 GPH, you could take that load a long way into the bush.

While not that many new-aircraft buyers are itching to wring out their investment on gravel strips hundreds of miles from civilization, the ability to haul a good load a long way in comfort and at a reasonable speed has a wider appeal, and that's a niche Expedition is trying for.

NOT A BUSH HAWK

The biggest change in the E350 from the Bush Hawk it descended from is the switch to tricycle gear. Tundra tires are optional, even with the nosewheel (but without the wheel pants), and all aircraft come with hard points for attaching floats.

The Bush Hawk was unusual in that its cabin was built on a steel cage skinned in non-structural aluminum. The E350 uses the same cage, but it's skinned in carbon fiber. This makes the cabin both lighter and larger, because the carbon fiber curves can offset further from the steel frame. The cabin is 51 inches wide at the forward seats and 53 inches wide in back. The frame provides the attach points for the engine, wings and semi-monocoque tail, and is why the E350 can sport four doors. The rear doors are simply huge. Big enough to roll in the obligatory 55-gallon drum. The doors have a solid, car-door feel. (The door latches come from Land Rover, in fact.) Somewhat overzealous gas springs hold them open nearly 180 degrees. While the door and spring attach points are beefy, they noticeably flex when the door swings wide. We wonder if they will loosen after years of abuse.

The wing is cantilevered, so there's no wing spar to get in the way. Checking the fuel will require a ladder, though. The E350 sits high and there's a step for the front seats but no step for the rear. The company is looking at adding one. We think

this is needed to keep passengers from stepping on, or tripping over, the rear wheel pants. Anyone who's dealt with a Cessna 206 will appreciate that the rear doors can open even if the flaps are still extended.

The rear seats have a long fore-aft range of motion and easily come out. Three adults across the back seats would be doable, but crowded. Some relief would be had by staggering the seat depth. The area behind the rear seats can still hold 250 pounds of gear. Front seats move back and forth easily, but vertical adjustment is by resetting pins and must be done on the ground. The glareshield is high, so shorter pilots may need that adjustment. All five seats are narrower and more basic than you'd find in a new Cessna or Cirrus. They are leather and comfortable, but more utilitarian than luxurious.

The E350's floatplane role is clear with overhead headset jacks, headset holders and the lack of a center console (so the pilot can slide out the passenger side when docking). Both front and the middle rear seats have four-point harnesses. The rear side seats have three-point systems.

What impressed us overall about the interior, however, was the level of finish and smart details. Part cut and fit is excellent. The doors incorporate a fat gap seal to keep wind noise down, as well as a well placed arm rest (and cup holder). In that space between the windscreen and the left of the glareshield where we all stick our charts, the E350 has a chart holder.

Primary controls for the airplane are on a common T-bar. This design hogs panel space and may account for why the glareshield is so high, but what's left is used well with everything within easy reach of the pilot. The E350 puts some switches on an overhead panel and uses a Garmin G500 plus a conventional Garmin radio stack, rather than an expansive G1000 or Avidyne glass cockpit. The company spins this as a more modular way to buy just the avionics you want, but we think it's more useful as a space saver. Either way, we'd agree it's a smart choice for the E350. Flaps and rudder trim are electric only. Pitch trim is electric

The E350's split personality is evident the moment you enter the cabin: Four huge doors with observer windows access a 53-inch interior sporting three quick-release seats in back. While the interior isn't opulent, the fit and finish quality is on par with any major aircraft manufacturer.

or via a manual wheel that runs a jackscrew adjusting the leading edge of the horizontal stabilizer.

With no opening windows, we wonder if the cabin will get too hot in the summer. The Wemac vents provide decent air once the prop is turning, but we tested the aircraft on a rather cool day. Taxiing with the doors open might be a bit too breezy.

Inspection panels are ample, including two welcome panels on the cowl. Inspection can be extra critical on a float plane where corrosion is an issue. To that end, we wonder if the jackscrew trim in the tail will be a corrosion issue for float use.

SPRIGHTLY FOR ITS SIZE

The airplane uses the Lycoming IO-580 rated at 315 HP. The coming turbo model of the E350 will use the TIO-540 just like Cessna's turbo 206, but uprated to 320 HP. The nosewheel is free castering, but once the prop is turning and the aircraft is so much as rolling forward, there's enough rudder authority for gentle turns without brakes. Takeoff is with 20 degrees of flaps and requires little rotation once the wing is at flying speed. We were several hundred pounds under gross on our test flight so we climbed just over 1500 FPM.

Handling overall was excellent, but with some interesting quirks. We expected a control feel similar to a Cessna 206—truck-like from a piston-single perspective. Instead, the forces measured out similar to a Cessna 172. The wing is basically a DeHavilland design dating back to the 60s, and with the significant dihedral and washout only at the wingtips. The result is that at low speed the ailerons feel light, yet their effectiveness is excellent and it's easy to overcontrol at first. At cruise the ailerons get heavier but are still quite responsive. The net is an aircraft that's more roll sensitive than competing models; it's still stable enough for easy IFR.

Pitch was also lighter than we expected, although well harmonized with roll at lower airspeeds. The E350 trims easily and holds its trimmed speeds well. There is a significant pitch change between zero and 10 degrees of flaps requiring some quick retrimming. On the topic of flaps, they are electric, but deploy and retract quickly. This can be a real plus in a floatplane setup where flaps can be used just to break free of the water.

Adverse yaw is significant enough that other pilots will notice if you turn with your feet on the floor, although passengers might not. Slow flight is predictably stable with both rudder and aileron control excellent right into the stall. In fact, spin testing showed the ailerons were effective even during a spin in most configurations. Power-on stalls have a distinct tendency to break right no matter how coordinated the entry.

The view is excellent in every mode except a power-on climb (where you're looking at nothing but sky). We feel a lower glareshield would change "excellent" to "phenomenal." The company aircraft has been flown with a rear door off, but that's not yet approved for the certified model.

Cruise speeds in our tests showed 152 knots true at 5000 feet with light weight but a seriously forward CG. Fuel burn was 17.2 GPH. That's right on the company claims when corrected for altitude. The literature

Attention to detail impressed us. The left-hand down tube of the steel frame is angled down out of the pilot's view. A space left of the panel offers a slot to hold your charts or waterway guide. The cross bar for the controls and high power quadrant give the E350 a Beaver-like feel.

AC TV

For more details on the E350, including more interior and in-flight footage, log on to www.avweb.com and select the video index and scroll down to the video link.

FOUND AIRCRAFT? EXPEDITION? WHO ARE THEY?

Buying an aircraft from a small company carries the additional risk that the company may vanish in the night, leaving the owner with an orphaned bird and no factory support. We put this question directly to Tony Hamblin, one of the two owners of Expedition Aircraft.

"We will always be a niche product," he told us. "We're not out to make a lot of money." Hamblin and his partner Bob Beamish invested in the Found Aircraft company, which had produced Bud Found's Bush Hawk on and off over the years. Bud Found retired in 2001, leaving the company in the hands of Hamblin and Beamish. They moved forward with the higher-power Bush Hawk XP model in 2004 and began development of the E350 in 2007. The name change to Expedition Aircraft was to help differentiate the model from the Bush Hawk line.

The company still functions on private investment of these two families, so there aren't creditors to pay back. Their business plan allows for profitability at 18 airplanes a year, although they told us they can cover expenses with production as low as 12 per year. At peak production, they would only make 24.

We think that 18-airplane mark is possible even in this economy, given the demand that exists on the used market for the Bush Hawk. The company has been savvy on leveraging the original Bush Hawk type certificate to shave some of the certification costs. The family-run company reminds us of Maule Aircraft, another small bush-plane company with a proven history and comfortable market niche. Family-run companies often get into trouble when they grow too much and can't make the transition to a more corporate structure. That's not in Expedition's plans.

There is a broader long-range plan. Once the turbo and tailwheel versions of the aircraft are complete, the company plans to investigate a turboprop version with a longer fuselage. The airplane would resemble a smaller Quest Kodiak, which itself is billed as a smaller version of the Cessna Caravan. We have our doubts there's enough market there, but we admire the company's pluck. "You have to look for an opportunity and take advantage of it, but you can't have rigid ideas of how to do that. You have to improvise and adapt," said Hamblin. "Once you stop moving forward, it's time to pick up your rubber ducks and go home."

predicts 175 knots for the turbo, but that's at 20,000 feet.

Landing the E350 surprised us similar to the takeoff. We expected to run out of back elevator at low speeds and kept up a bit of power just in case. It wasn't needed. There's plenty of elevator authority for power-off short-field landings. Just watch the descent rate when the power goes idle. The wide cabin makes for plenty of drag even without slipping. We didn't win any short landing contests in our testing, but that wasn't the aircraft's fault.

WHO'D BUY ONE?

A base E350 is $495,000 (U.S. dollars) and the base Turbo E350 will likely be $530,000. That includes the G500 panel and one GNS 430, but no autopilot. A second 430, datalink and an integrated S-TEC 55X autopilot drives the price up about $58,000. Straight floats or amphibious gear add $53,500 and $101,000 respectively. There's no true production line at Expedition, so each aircraft is hand built and comes with a three-year/1000-hour warranty.

The obvious market contender is the Cessna 206, which is priced comparably. We think the E350 easily bests the 206 on ease of loading and overall performance—especially handling. Comfort is in the eye of the beholder. The E350 is wider, but the 206 comes with more luxurious seats (and there are technically six).

We could see a potential buyer of a 182 buying bigger and going for an E350, especially for the ease of loading. We could even see a buyer attracted to a normally aspirated Cirrus SR22 but willing to trade 20 knots of cruise (and higher fuel burn) for a needed fifth seat, or short-field capability. The coming turbo model of the E350 may shave the speed penalty a bit for those willing to cruise high. Of course, the E350 is set up to make a phenomenal float plane. Another niche, to be sure, but one that we think has no equally capable competitor at this performance and price point, not even from the 206.

The right E350 buyer is also someone drawn to performance more than convention, who's more likely to fly by hand than settle back on autopilot in cruise, and enjoys the bragging rights of flying something that's just a little bit different.

CONTACTS

Expedition Aircraft
www.expeditionaircraft.com
705-378-0530

Aircraft Loans Market: Rates Never Better

Lenders are conservative on what they'll finance and who they'll lend to, but if you can jump the hurdles, the rates are terrific.

by Jeff Van West

In 2003 when we looked at the aircraft loan market we said, "If rates go much lower, the money will be free."

Well, they're lower. And though the money isn't free yet, it's cheap to those who can qualify. The recent financial chaos means there's no wink-wink, nudge-nudge approval, but it also means that the surviving lenders are looking for those qualified buyers.

There's less competition in the loan market and some big players, like Sovereign Bank, have pulled out. Reselling and securitization of loans isn't the market it once was. This means a greater reliance on equity lending—borrowing against the value of the aircraft—and tougher standards for the borrower.

YOUR CREDIT PICTURE

As we've said before, evaluating your own credit is a good idea. Stats say up to three out of four personal credit reports contain some error. It may take up to two months for you to clear erroneous information. Get that process rolling right away. Privacy Guard is a reseller of credit information we've looked at in the past. There's also the well-known Equifax.

These services offer reports, as well as ongoing monitoring that will alert you if something pops up during the time you're shopping around for a loan. This is important because we've heard from lenders that banks are getting extra touchy about things like outstanding credit card debt or missed payments. Where one erroneous late payment wouldn't have tanked a deal in the past, it can now. Lenders are looking for credit scores of 700 or so these days, about 50 points higher than when we looked at this topic two years ago.

In addition to getting that squared away, expect to deliver two years of tax returns, proof of income and your personal financial statement. Cathy Nyen of Cirrus Finance told us that liquidity is particularly under the microscope. Banks want to ensure an buyer can withstand an unexpected drop in income. Take a look at your debt-to-income ratio (DTI).

CHECKLIST

- ⊕ Lenders competing for qualified buyers.
- ⊕ Low rates can make refinancing an existing aircraft loan pay off in a few years.
- ⊖ Lenders want higher qualifications and more equity in the aircraft than in previous years.

Lenders are more shy of older models, or anything with a damage history, than they have been in the past. Savings on older models in price could be cut by higher interest rates and subsequent payments.

This is essentially all your monthly payments (including the aircraft loan) divided into your monthly income. Lenders are accepting DTIs of up to 50 percent, a bit higher than in recent years.

If you're weak somewhere on the triumvirate of credit-score/liquidity/DTI, don't panic. It's a package deal. That said, we've heard rejection rates as high as 60 to 70 percent of applicants contacting lenders. That may reflect a number of people rolling the dice in a vain attempt to stem the outflow from overleveraged aircraft. Nyen of Cirrus says the rejection number is well under 25 percent from where she sits. Dan Garelloni, president of Mile High Financial, says he sees numbers more like Nyen's.

All lenders agree that getting your credit squared away early, even before you have specific aircraft in mind, is a good plan.

NEWER AIRCRAFT EASIER

Where 20-year terms and 10 percent down was common even two years ago, the majority of lenders we spoke to require 15 percent. That's 15 percent of the valuation or the agreed purchase price, whichever is lower. Many want 20 percent for new aircraft where just the first year depreciation can put a borrower underwater. Lenders still sting from many repos sold at auction. AOPA has good online aircraft valuation tool.

For the same reason, many lenders are shying away from older aircraft. "Old" for a piston plane is pre-1975. For turboprops, they want to see 1980, and for jets it's 1990 at the oldest. Some lenders won't do jets even 10 years old. The model also matters. For the same year, it's harder to get financing on a Cirrus SR22 than a Bonanza because there's still a glut of the former on the market. Eclipse 500s are tough because the company's future is uncertain even though it's under new management. This makes the lender nervous in the face of your possible default and their acquisition of the aircraft. Other safe bets we heard lenders like are 172s, Meridians, King Airs and small- to mid-size Citations.

Before you give up on that beautifully preserved and updated 1968 Comanche, however, realize that the aircraft lending market is a niche by definition and lenders are stratifying to find their sub-niche within it. Mike Jacobs is the former president of First Pryority, a lender in the aircraft market for many years, and says they like older, single-engine pistons for the very reason that other lenders don't. First Pryority is a direct lender, so they don't have to convince another bank to get the money. That said, Jacobs acknowledged it's an increased risk that results in a higher interest rate. Where a three-year-old Cessna might garner a 5.75-percent loan, a similar loan on the '68 Comanche could top seven percent. You need to weigh this out on what it means for the total cost to you of the aircraft.

Many lenders will offer loans against avionics upgrades and there are those who will underwrite experiementals. New light sport designs aren't quite so lucky. Some banks will loan for established manufacturers such as Flight Design, Remos, Evektor and Tecnam, as well as known companies like Cessna and Van's Aircraft for the LSA homebuilt RV-12. Getting a loan north of $100,000 for a lesser known manufacturer is almost impossible.

Each bank may have its own quirks. Many won't write an aircraft that has had any damage history. Some want detailed photos of installed equipment. Apparently there was a rash of avionics disappearing out of aircraft just before repossession in recent years.

PICKING A LOAN

The questions you need to ask are: What can I afford each month and how long will I be in the airplane?

You'll hear different rates for the three basic types of loans: fixed, variable and balloon. Fixed-rate loans give you the same interest rate that stays fixed for the life of the loan. These protect you and that great rate you're locking in, but cost more as

THE EARLY PAYDOWN PAYOFF

WHAT LOANS COST...

LOAN TERM	AMOUNT BORROWED	INTEREST	MONTHLY PAYMENT	TOTAL INTEREST COSTS	TOTAL LOAN COSTS
10 YEARS	$150,000	6%	$1665.31	$49,836.90	$199,837.20
15 YEARS	$150,000	6%	$1265.79	$77,841.34	$227,842.20
20 YEARS	$150,000	6%	$1074.65	$107,915.00	$257,916.00
15 YEARS	$300,000	6%	$2531.57	$155,682.60	$455,682.60
15 YEARS	$1.5M	3.8%	$10,945.58	$470,204.80	$1.97M
...AND WHAT EARLY PAYDOWN SAVES					
10 YEARS	$150,000	6%	$2191.93 (+$525.98)	$34,122 (SAVES 8%)	$184,122.96
15 YEARS	$300,000	6%	$3330.62 (+$799.04)	$96,074.40 (SAVES 12%)	$399,600.00

Before signing on the dotted line, ask if the bank charges a penalty for early paydown. If not, the chart above shows that this an excellent way to save a lot of money on interest payments. If the 10-year loan is paid off in seven years, for example, the additional $525.98 monthly payment will save $15,000—lots of help with an engine overhaul or avionics upgrade. You'd do better putting that same sum in a high-yield investment, but in the current market, that may be hard to find.

Looking just at numbers, if a borrowed $150,000 is 85 percent of the aircraft, you could buy a nicely equipped recent-model V-tail Bonanza or a 2005 glass-panel Cessna 182. Higher up the food chain, a $300,000 loan will give you the pick of a veritable fleet of two- to three-year-old Cirrus SR22s. But, as we've said, the older Bonanza or the market-glut Cirrus might demand a higher interest rate.

interest rates will likely go up (they can't go much further down). The longer the loan term, the more risk the bank is taking. We're not seeing much difference in 15-year versus 20-year fixed rates, but there are buyers getting astounding rates on five- to seven-year fixed loans.

Variable-rate loans adjust to an agreed index, such as the prime rate. You'll get a better rate on these loans short-term but the rate can, and probably will, rise. Lenders we spoke to were split on the value of these to the buyer. Given the sluggishness of the economy, many agree rates are unlikely to rise much in the next five years. If you're planning to be out of the airplane then, this could pay off for you. But that assumes you can sell the craft when the time comes.

Balloon loans guarantee a fixed rate for a pre-determined period of time, often five to seven years, based on amortization over a longer term, such as 15 years. This makes for low payments up front, but when the short term is up, the balance must be paid off or the loan converted with a rate increased to a stipulated amount for the rest of the loan term.

Most small aircraft buyers seem to be happy with the fixed rates given the protection it gives them down the line, and we think this is a good plan, especially if you can pay extra each month to pay down the principle faster.

Knocking 0.1-0.2 percent off your rate could save $50 a month on a $300,000 loan. Think of it as getting your XM weather for free for the next 15 years.

Aircraft loans usually last less than five years. After that, the aircraft is sold or refinanced. We couldn't get hard data, but our hunch is this number is increasing, if for no other reason than the sales market is so soft. Another strategy if you have the cash is a bigger down payment. Paying 25 percent down can net you 0.1-0.2 percent off your rate, and could save $50 a month on a $300,000 loan. Think of it as getting your XM weather for free for the next 15 years.

Tom Bell of Excel Aircraft loans pointed out that this can be a great time to refinance for the right owner. The ideal candidate is someone who has some equity in the plane, or might be slightly upside-down on a newer aircraft but has some cash looking for an investment. The former could just refinance for a significantly lower rate and/or a shorter term. The latter would essentially invest in their own airplane and buy down the amount needed for the refinance. Either solution could slash the cumulative interest payment and work out as a net return on investment.

Refinancing a three- or four-year-old Cirrus bought at 6.5 percent could save hundreds of dollars a month. Refinancing a $2.7M jet under such terms could save hundreds of dollars a day.

We didn't see a major difference in rates from a broker versus working directly with a bank. They will perform the same services. You just want to watch that there's no hidden fee from the broker for their services. Usually their fee is wrapped in the rate quoted on the loan. Any large fees you pay should come back to you in a lower rate or you should get your money elsewhere.

Closing costs are commonly around $600 for aircraft loans. Make sure there is no early payment penalty if you plan to save some interest by paying down the principal ahead of schedule.

START ONLINE

Any player now has a website where you can download loan applications and many have loan calculators to run some numbers on your own. Approvals are often made the same day, whether from banks or brokers.

Shop around. We like the idea of personal service smaller banks and brokers, as when Dan Garelloni told us, "Sometimes I really have to fight for these guys." But we're not seeing an advantage price wise in big versus small lenders.

There's a hunger in lenders for good buyers. Just like it being a buyer's market for aircraft, it's a borrower's market for money if your personal finances are up to the scrutiny of a recently burned lending market.

CONTACTS

Aircraft Banking Centers
800-814-6682
www.aircraftbanking.com

Airfleet Capital
800-390-4324
www.airfleetcapital.com

Airloan (Red River Bank)
800-472-1754
www.airloan.com

AOPA/Bank of America
800-627-5263
www.aopa.org/info/certified/afp/

Cessna Aircraft Finance
866-232-5626
www.cessnafinance.com

Cirrus Aircraft Finance
888-450-4826
www.cirrusaircraft.com/ownership/finance/

Dorr Aviation
800-214-0066
www.dorraviation.com

Excel Aircraft Finance
800-337-7774
www.aircraftfinancingdirect.com

First Pryority
918-825-2121
www.firstpryoritybank.com

Mile High Financial Corp
800-439-4860
www.milehighmoney.com

NAFCO
800-999-3712
www.airloans.com

EI's MVP-50: A Does-It-All Monitor

It has the usual engine and instrument capability, but adds additional features that fill in the gaps in aftermarket glass options.

by Paul Bertorelli

The good thing about glass displays—they're really big—is also the bad thing about glass displays. (They're really big.) That means for pilots and installers alike, shoehorning something like a G600 into a legacy panel can be a challenge if you can't get rid of something in the bargain.

A likely thing to be rid is the mid-century electromechanical engine gauges that squat on the panel, but don't provide anything other than a single reading. That's where new-age engine monitors like Electronic International's MVP-50 come in. Increasingly, these large-screen monitors do far more than just track engine trends, and the MVP-50 does more than any engine monitor we've seen to date.

We recently had a look at this device being installed in a Cessna 210, alongside Garmin's G600 aftermarket EFIS. Given the MVP-50's size, that sounds like too much glass even for the 210's large panel, but with the traditional engine gauges disposed of, there's a net gain in efficient use of panel real estate.

CHECKLIST

- Display is large, sharp and well designed, yet can still find a spot on the panel.
- The MVP-50 can monitor engine and system functions that other monitors can't.
- It's an excellent adjunct for systems like the Aspen EFD1000 or Garmin G600, which lack instrument capability.

GROWTH TREND

The MVP-50 is one of a growing number of large-screen monitors—see the complete list in the chart on page 13—that are beginning to displace the classic dancing orange bar instruments that GEM and JP Instruments built businesses around. Inevitably, as color displays improved and became cheaper, engine monitors became larger and integrated more functions, culminating in the MVP-50.

At roughly 5 inches square, the MVP-50 is slightly narrower than the standard radio stack width and a bit taller than a Garmin GNS530. That means in most cockpits, it's going to live in the far right panel, not in the center or on the pilot's side. Realizing that, EI has a remote annunicator/alarm option that's small enough to fit on the pilot's side panel and will alert of any out-of-range conditions.

And that could be a lot of stuff because the MVP-50 is capable of tracking just about every trend and system in the aircraft, from basic engine parameters, to fuel quantity and flow and things like flap and gear position. It also has GPS interface functionality.

ARCHITECTURE

The MVP-50 is a two-box system, with the main guts of the instrument contained in a 5-inch square

SELECT KNOB FOR DATA ENTRY

EXIT/BACK/ RETURN KEY

TOGGLES THROUGH SCREEN CHOICES

MENU IS CONTEXT SENSITIVE

STANDARD USB PORT FOR DATA DOWNLOAD

The system screen, above, is customizable to each aircraft installation and can graphically track system status such as gear, flaps and trim.

Weight and balance calc data is scrolled in with the select knob and the solution is presented visually, above.

Data managment page is logical and easy to manipulate. Note that engine parameters remain in view on all screens.

display unit. It generally uses existing sensors—CHT and EGT probes, pressure sensors, fuel senders and so forth—so there's not a huge amount of rewiring to do on the firewall and systems side. But all of that sensor data has to be passed through what EI calls a Engine Digital Converter that converts the analog data into a digital signal the MVP can process.

The MVP-50 is shipped with the correct transducer set for the aircraft in which it will be installed, and EI's Dave Campbell told us every conceivable temperature and pressure value has a sensor channel and there are additional channels for expansion.

Because the instrument accepts and displays so much data, EI customizes each unit on a per-customer basis before it goes out the door. It has a worksheet that the buyer fills out before the order is shipped, assuring that the airplane's required limitations appear on the instrumentation.

But the customization doesn't end there. The MVP-50 has a total of 13 discrete data screens and some of the fields in these screens can be reset on the fly. There's even a fully detailed help screen, although we didn't need it because the MVP-50 passes the ultimate acid test for operating logic: We ran through it from start to finish, without cracking the operating manual.

SCREEN NAV

A single key toggles through the screens and the way it does that can also be customized by changing the order in which the screens come up. The MVP-50 offers the option of showing engine parameters digitally

CONTACTS

Electronics International
877-318-6060
www.buy-ei.com

J.P. Instruments, Inc.
800-345-4574
www.jpinstruments.com

Vision Microsystems Inc.
210-447-2446
www.visionmicrosystems.com

Flightline Systems
585-924-4000
www.ultra-fei.com

LARGE SCREEN ENGINE MONITORS COMPARED

	EI MVP-50P	FLIGHTLINE SYSTEMS AURACLE	JPI EDM730	JPI EDM740	JPI EDM830	JPI EDM930	JPI EDM960	VISION VM1000C
PRICE EXPERIMENTAL 4 CYL/6 CYL	$4995 $5485	CRM2100 (4) $6995 CRM2100 (6) $7495 CRM 2101 (4) $5595 CRM 2101: $5650	$1995 (4) 2750 (6)	$2999(4) $3250(6) (Experimental only)	$3795(4) $4295(6)	$5481 (4) $5915 (6)	$14,562 (4) Twin $15,822 (6) Twin	$2853
PRICE CERTIFIED 4 CYL/6 CYL	$5995 6485							
UNIT SIZE	5.16 H X 5.525 W	4.5 H X 6.25 W	3H x 4W (Bezel rotates)	3H x 4W (Bezel rotates)	3H x 4W (Bezel rotates)	5.0 H X 5.1 W	5.104 H X 5.970 W	H x 5.1 W
WEIGHT	1.9 LBS	1.9 LBS	1.9 LBS	1.9 LBS	1.9 LBS	2.6 LBS	3.0 LBS	2.1 LBS
PRIMARY IN CERTIFICATED AIRCRAFT?	Yes	Yes	No	N/A	No	Yes	Yes	No
DISPLAY TYPE/ SIZE	Active Matrix TFT (256K colors)/3.35 H X 4.45 W	Color LCD	Color LCD	Color LCD	Color LCD	Plasma/4.65 H X 4.6 W	Color TFT/3. 64 H X 5.125 W	Color LCD/ 4.65 H X 4.6 W
MEMORY HOURS (HIGH SAMPLING)	690-plus	100 to 150	200	200	200	33	800	TBD
SAMPLING RATE	.33 seconds-6 minutes	2 seconds	2-255 seconds	2-255 seconds	2-255 seconds	2-255 seconds	2-255 seconds	2-500 seconds
MULTI-ENGINE CAPABLE	No	Yes	No	No	No	No	Yes	No
FUEL QUANTITY	Standard; probes may be required	2120 for twins only	No	Yes	No	Yes	Yes	Yes
FUEL FLOW	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes
MEMORY INTERFACE/ GPS INTERFACE	USB/Yes	USB thumbdrive/ Yes	Yes	Yes	Yes	Serial or USB/ Yes	Serial or USB/ Yes	USB/Yes
REMOTE ANNUNCIATOR/ AUDIBLE ALARM	Yes/Yes	Yes/Yes	Yes	Yes	Yes	Yes/No	Yes/No	Yes/No
EGVIEW COMPATIBLE	Yes	Yes	No	No	No	Yes, after conversion	Yes, after conversion	Yes, after conversion

via tape-type sliders or graphically with an engine icon and cylinder and EGT values displayed right next to the cylinder. As you're toggling through the choices, the MVP-50 keeps the required engine instrumentation in the right third of the screen at all times, thus satisfying the FAA's stricture on legal replacement of the OEM instruments.

What we found most appealing about the MVP-50 is that the auxiliary screens—although a little denser with type than we would like—were logical and easy to use. And there are a lot of them, including a fuel calculation and range page, CO2 detection through a CO Guardian add-on option, weight and balance, a help sheet with engine diagnostics based on what's being displayed and even some AIM guidance with reminders on VASI light indications and VFR minimums.

That's way more than engine monitors have traditionally done and so is accurate fuel gauging, which the MVP-50 also does. It uses the OEM tank sensors and during installation, the display can be accurately recalibrated by filling the tanks a gallon at a time. Tedious, but worth it for the accuracy.

CONCLUSION

What surprised us most about this product is how complementary it is of aftermarket glass panels, which lack the sophisticated engine monitoring that are now standard in Garmin and Avidyne setups. With something like a G600 installed, the MVP-50 more than holds its own in replacing OEM instruments and, interestingly, it makes it possible to bring a legacy airplane like a Cessna 210 or mid-1980s Saratoga to nearly state-of-the-art on a reasonable budget.

Given those benefits, we think the MVP-50 is an excellent choice for anyone who wants an engine monitor or device that can also keep track of systems status such as gear and flap position, trim and other nice-to-knows.

Feeding The Data Beast: Little Relief in Sight

The dark side of our data-driven cockpits is that all that data isn't free. There are ways to scrimp wisely, and new options may offer hope.

by Jeff Van West

We've been getting an increasing number of letters like this: "I will get together my Jepp bill for you. It comes to something like $17 per flight hour, figuring my decline to 150 hours per year. Nav data for two Garmin GNSs, one MFD and one PFD; all the same, but four different charges. (Granted, the two GNS get a discount.) Plus paper charts for the southeast and electronic approach charts for the MFD."

That's $2500/year just for data. And that doesn't include a $50/month subscription for weather, or periodic updates of terrain and obstacle data.

On the road from four-dollar NACO chart books and en route charts to the modern cockpit, we've somehow gone off into the abyss.

HOW DID WE GET HERE?

Having the latest information in the cockpit has always been the pilot's responsibility, and has always been a source of stress and misconception. The common strategy was flying with charts (VFR and IFR) and approach plates that were within the effective dates printed on the cover and calling it good. (How many folks ever updated those charts for NOTAMs dates is questionable.) Others got new charts when the existing book had too many stains from spilled coffee to read.

The advent of IFR Loran and GPS changed things. Many of these had a mandate in the manual to only fly approaches with a current database. Not that everyone always shot an approach with the latest database, but blindly trusting a cryptic interface in the clouds when you knew it wasn't current was too sphincter-tightening for most. Hardware manufacturers contracted to have the data come from a company who knew that business, and had the infrastructure to digest and deliver it (remember, these datacards used to come in the mail). That company was Jeppesen.

As more boxes got installed, each with its own data source, there were more subscriptions and more load on the wallets of owners.

WHAT DO WE DO NOW?

The first real pushback on this that had some effect was probably from owners with the popular twin GNS 430 installations. They were being charged the same for each datacard and that seemed unfair. Jeppesen acquiesced, and today one year of nav data for a 400W/500W-series Garmin is $380 for the first unit and $135 additional for the second. That's a 65-percent discount.

Nav data costs change with the system used. A Garmin G1000 or Avidyne Release 9 cockpit uses a single nav data subscription, but that data costs $415. We appreciate that each system Jeppesen supports requires the same data to be encoded in different ways, but we also hear the complaints of customers that the $35 delta feels like a surcharge on those who only buy nav data once.

But there's terrain and obstacle data, too. This data comes from Garmin directly as a subscription or one-time update. Terrain will run you about $150 for each device, and each update and obstacles run about $50 for a one-time or $195/year.

With the coming of the G600/500 retrofit glass, Garmin has started to infringe on Jeppesen's traditional turf. You can buy G500/600 nav data from either source (and it's Jeppesen's data either way) but the price differs. Jeppesen charges $210 for a year while Garmin charges $295. However, Garmin offers a one-time update for $75, which could be a cheaper way to go if you're willing to let that data get stale for a while.

That structure is similar with Flite Charts, the government charts that appear on Garmin MFDs or the GPSMAP 696 portable. A single update is $95 and a year's subscription is $395. These charts are only georeferenced on the 696 portable, but we expect that feature to hit the panel mounts as soon as Garmin can certify it. Jeppesen offers its own charts for Garmin or Avidyne systems for $905/year for the whole U.S.

Does this hint at a cooling relationship between Jepp and Garmin? Both companies say, "absolutely

not." While GA represents a minority of Jeppesen's total business, it's still over 30 percent. Garmin also can't supply the international data needed to support users worldwide. The companies need each other.

But it's clear that everyone is seeing the subscription world as a real revenue stream. Jeppesen prints *half* the paper it did in 2002, while subscription numbers haven't changed.

COMPETITION ANYONE?

We know that part of the reason these prices are so high is that all this data flows into certified, panel-mount gear. We don't expect to see $395 lifetime subscriptions for MFD approach charts or GPS navigation data the way both can be had for portable systems. But the other part of the price equation is that data is largely a monopoly.

Garmin told us directly that there's no copyright or contractual barrier for a party other than Jeppesen creating databases for Garmin devices. For the U.S., the data (including charts and approach plates) is freely available, and several small companies have been putting it together for portable GPS devices and desktop planning programs, so the job of gathering the data is doable.

The tougher nut is encoding it correctly for the cockpit equipment, but we've heard from reliable sources that some portable GPS company employees have cracked the GNS 430's encoding and update their own databases.

The catch is that for those databases to be legal, they would need Garmin's blessing and ongoing involvement every month. The current process for a database update using Jeppesen's data is that they extract the needed data every 28 days and then send it over to Garmin. Garmin massages that data and adds some items of their own (they told us about 30 percent of what's on a 430's nav data card is Garmin data) and they send it back to Jeppesen for final packing and distribution. Given the mutual importance of Garmin and Jeppesen to each other, there seems little incentive for working with a third party, at least with existing devices.

But this summer Garmin offered bundle pricing on database updates

CAN I JUST LET SOME DATA EXPIRE?

There are simply too many systems and combinations of equipment for us to make any sweeping statements here that apply to everyone. But you can make informed decisions as to what you keep current and what you let expire (if anything) based on what consequences that choice has for your setup's legality and functionality. We're also only talking Part 91 here. Part 135 or other will have an ops spec that might require something different.

Before digging too deeply into what your options might be for saving money on devices, we need to get our terminology straight.

Nav data: The positions of airports, navaids and fixes; radio frequencies; approach procedures; airport information; airspace boundaries and more.

Obstacle data: Human-made obstacle positions and altitudes. Used by GPS navigators that have terrain alerting, MFDs and PFDs with synthetic vision.

Terrain data: A grid of terrain lat/long cross-referenced with altitude. Used by GPS navigators that have terrain alerting, MFDs and PFDs with synthetic vision.

Chart data: Approach charts, scanned en route or sectional charts and airport diagrams can all fall into this category. Subscriptions can bundle all those items in one, such as a chart data subscription for a Honeywell AV8OR Ace, or offer parts under separate names, such as Garmin's Safetaxi and FliteCharts.

GPS NAVIGATORS

There's not much room for latitude here, but there's some. Most GPS navigators have a note in their operations manual that you must have a current database to fly a GPS approach. This makes the requirement regulatory. There are some GPS and RNAV units that say only a pilot must verify the positions of the waypoints are correct to fly an approach with an out-of-date database. While technically not regulatory, AIM guidance is that you need a current database for approaches or know the procedure hasn't changed. Our thoughts: If you're going to use a GPS for approaches, pony up for a database subscription.

If you're not flying GPS approaches, you can let the GPS database get stale. Most devices can still be used for en route navigation—you can still file /G—and can work in lieu of DME or an ADF for approaches. (We can split hairs about AIM versus AFM guidance, but let's agree that NDBs and LOMs rarely move.)

We also know folks who only keep one subscription for their two Garmin navigators. When updating their primary nav, they move the just-expired datacard to the number two unit and put the updated card in number one. This disables the flightplan crossfill function.

The navigators also may have terrain and obstacle databases. While we can't advocate skipping data that might keep you from hitting a new cell tower, we can say that these would be the first database updates we'd personally skip. Terrain warning will work no matter how old the database is, as will warnings for towers that existed at the time the database was current. Even if we did keep obstacles current, we'd only do it in one navigator if we had two. Integrated systems such as the G1000 or Avidyne R9 have only one nav, obstacle and terrain database for the system.

Potential savings and consequences: About $400/year if you give up legal GPS approaches, ~ $200 if you give up flight plan crossfill. An additional $250-$500/year for flying with outdated terrain and obstacle data.

MFD APPROACH CHARTS

These are advisory-only in any system we know, so there's no requirement to keep up the subscription. You won't save any cash getting Jeppesen charts on paper or a portable device versus getting them on your MFD, however. In fact, paper can be more expensive. (*continued on page 16*)

If you fly with government charts, your options are limited only by the amount of hassle you're willing to put up with. Free charts are available for the downloading and printing. Free or low-cost subscriptions can be had for readers such as the Kindle or Sony readers. Sectional charts, en route charts and approach plates combined for the entire U.S. can be had from ForeFlight for an iPad or iPhone for $79/year—plus the cost of the iPad.

Note that MFD charts will be accessible for some period after they expire, but not forever. On a G500/600, it's 180 days after expiration for government charts and 70 days for Jeppesen.

Potential savings and consequences: $300-395/year for government charts (investment in digital reader not included); no savings on Jeppesen charts.

MFD NAV, OBSTACLE AND TERRAIN DATA

This data is also advisory only. If you're going to let something slide, this might be a good target. Fixes in your flight plan from a remote GPS should display correctly on the MFD even if the fix is not the same, or even included, in the MFD nav data database. That's not true of fixes not in your flight plan.

Potential savings and consequences: From nothing to $1400/year, depending on your equipment. Effects vary, but usually limited to unreliable airport details and occasional mismatch between waypoint position on the MFD and the GPS navigator for non-flight-plan waypoints.

PFDS, PFD/MFD COMBOS

Aftermarket PFDs might have their own database. They must have access to some database if they offer synthetic vision. Sometime data is shared between a PFD and MFD, such as with the G500/600, or can be had on a single subscription, as with the Aspen Evolution system. These systems can be good candidates for periodic, one-time updates to save a bit. You can also smartly update. For example, we'd rather have current terrain and obstacles on a G500 PFD than on an attached GNS 530W. Either one can give terrain warnings, but the systems are independent warnings are easier to see on the PFD.

Potential savings and consequences: Ranging from $200-500/year. Some functions, such as synthetic vision, may not work if data is too far out of date.

PORTABLES

People rarely update their portables unless they are using them for digital charts. There's no requirement to have data current on a portable. (Funny that people don't worry about the out-of-date portable but feel they can't fly with out-of-date paper.) Yet the portable might be the cheapest way to keep current on airport frequencies and information, as well as charts and approach plates. Not to mention, a portable with a GPS makes a great backup. Terrain and obstacles are usually just as pricey on portables as panel mounts, but some brands bundle all the data together for real savings.

Potential savings and consequences: Varies widely, but in terms of data bang for the buck, updating a portable system is usually the best deal.

for its popular GPSMAP 496 and 696 to the tune of over $700 off (about 50 percent). We think this was a direct reaction to pressure from competing products with lower subscription costs.

Ask Steve Podradchik, CEO of Seattle Avionics, about the current data crisis and he'll tell you he "prefers to think of it as a data opportunity." Seattle Avionics started out as a player in desktop flight planning and EFBs. Now chart data itself is becoming a big part of their business.

In addition to supplying Voyager users, Seattle Avionics supplies the chart data for a host of iPhone/iPad applications, the Bendix/King AV8OR and AV8OR Ace handheld GPS and, most importantly, the Aspen Evolution MFDs. The last one is critical because it crosses the line into certified devices. Seattle Avionics also now has crucial European data, including VFR and IFR charts and approach plates.

Could a nimble startup compete with the likes of Jeppesen for supplying data? Maybe. Jeppensen told us there are on the order of 185,000 nav data changes worldwide every 28 days. That's just nav data, not charting or obstructions. Every 56 days there could be up to 5000 chart changes in just the U.S.

Podradchik isn't daunted by this, and told us they'd love to be in the market for supplying nav data for the likes of Garmin, and that they were discussing data relationships with multiple potential partners.

We could see a buyer choosing between an Aspen retrofit and a Garmin G500, or making a GPS upgrade decision, partially on the cost of subscriptions. U.S. Georeferenced approach charts from Seattle Avionics for an Aspen display are $299/year. Chart data (approaches and en route charts) for the Bendix/King AV8OR Ace is $399/year. Nav data for the Aspen displays and Bendix/King navigators comes from Jeppesen—for now.

VALUE ADDED DATA

Where all this is going is hard to say. Both the revenue from subscriptions and customer frustration is on the radar of manufacturers. While data for existing products is unlikely to get cheaper, we expect some price competition in subscriptions with new products as they hit the market.

We also predict competition over what a piece of avionics does with its data. There's already been motion on simplifying the download and update process for cockpit data. We know Jeppesen is experimenting with smart approach systems for GA that highlight or offer certain data depending on the phase of approach. Garmin and other players hinted at similar future improvements when we talked to them.

That means we may be getting more flying help from our data in the future. Of course, that may make paying for all those updates all the more necessary. Or else we'll start getting letters about how the overpaid digital copilot keeps suggesting the wrong CTAF frequency.

GPS Mounting Solutions: RAM Tops Our List

Cockpit-eating GPS displays like the iPad and GPSMAP 696 are nice to look at, but a pain to mount. Here's a look at some helpful products.

by Paul Bertorelli

CHECKLIST

- ⊕ Reluctantly, we conclude that the yoke is the best place for a large GPS.
- ⊕ RAM's myriad choice of mounts, arms and brackets address yoke and other options.
- ⊖ As much as we love large GPS displays, they force the pilot to bend to the technology, not the other way around.

The age of the Big GPS unearthed an annoying truth: They don't fit in the cockpit. Now that we've evolved to the Really Big GPS, things have only gotten worse, so any attempt to mount a portable navigator can only be called a varying degree of compromise.

But compromise we must, so we recently set out to review a range of gadgets designed to mount a portable navigator in the cockpit in such a way that makes it actually useful. Most of these are from RAM Mount Products, but there are others as well, including stock offerings from the GPS makers. For this article, we'll concentrate mostly on RAM's offerings.

THE YOKE PROBLEM

At the outset, we'll declare a bias from the start. We don't much care for yoke mounts, except for the smaller navigators, which doesn't describe many of them these days. The reason for this loathing is several fold. Large GPS units can obscure the primary instruments, or at least portions of them and this compromises a cockpit ergonomic climate that's not all that great to begin with.

The larger the GPS is, the more weight it represents on a control that was never designed or intended to have stuff clamped to it. Yes, we know, you get used to it, but a heavy GPS on the yoke changes the control feel and can cause interference at times, which is something we simply don't want.

Last, the wires, in all their stinking tangliness. This has improved with the advent of Bluetooth technology, but it's still a nuisance, in our view. For example, in Garmin's GPSMAP 696, there's a fat power cable in and a skinnier XM antenna out. The good thing is that these wires are a little stiffer and fatter, so they're not as prone to tangling as they once were. The bad news is they're still there.

The only practical solution is to route and stow them semi-permanently out of way, using tie wraps, Velcro pads or commercially available wire ties and organizers. If you rent an airplane or otherwise remove the GPS frequently for dual duty, this adds to the nuisance factor. Some pilots buy an extra set of cables to address this, but the best solution remains use of Bluetooth where

RAM's Cessna seat rail mount, lower right, is a good if compromised solution for the iPad or GPSMAP 696. It mounts to the rail via a thumbscrew clamp, lower photo. When mounted horizontally, lower left, the iPad consumes the entire space between the yoke horns. Nonetheless, horizontal yoke mounting may be the best choice.

RAM's suction cup mount, left and inset, is an option, although it might be iffy in turbulence. The glareshield clamp, middle photo, positions the 696 nicely, but the Skylane glareshields lack the stiffness to hold it firmly. Both the 696 and iPad cradles, lower photo, have offset mounting points to maximize positioning options.

applicable and tie off what cables remain so they're out of the way.

RAM Mounting Systems is well known for its extensive line of gadgets for mounting just about anything into anything. It has products to address a wide range of mounting challenges in aviation, marine, automotive, industrial and sporting applications.

Most of the products are based on a patented hard rubber ball-and-socket design originally called Round-A-Mount, from which RAM is derived. The core of each mount consists of a 1-inch hard rubber ball attached to a bracket of some kind, which is in turn attached to the object to be mounted.

Most RAM mounts consist of a custom plastic cradle that the device snaps into and to which the bracket and ball are screwed or clamped. From that point, the basic connection hardware is a spring-clamp arm equipped with a socket at each end into which the hard rubber balls fit. The arms are available in various lengths and styles to suit the user's whims.

OEM mounting hardware has generally been fair to middling, in our view, but it seems to have improved over the years, since buyers have complained about flimsy mounts for what they view as expensive navigators. Another reason is that RAM has supplied some companies with GPS mounts, including Garmin.

RAM mounts tend to be a notch or two more rugged than the OEM offerings and they are hands down more flexible, so if you want to reduce the nuisance factor, RAM has the parts and pieces to do that.

IPAD

Our quest for the perfect mount started when we sought a means to mount an Apple iPad in the cockpit for aviation app testing. The iPad is so large that this is a significant problem. At 5.8 by 7.7 inches, the iPad obscures or interferes with something no matter where you put it.

First, the cradle. RAM used its standard solution for this: a plastic cradle with two tabs at the bottom and one at the top. The iPad simply snaps into this and you're done. (Retail: $66.05.) Ours fit perfectly. The cradle even has the Apple cutout at the back, although we're not sure why.

From there, there are several choices. The iPad cradle's ball mount can be screwed to the lower center of the cradle or offset to one side, a real plus if you can't wrangle the flexibility you need out the available range in the spring socket arms.

For yoke mounting, RAM provides a big honking C-clamp apparatus ($42.65) with a ball into which the socket arm snaps. The arms are available in various lengths, with prices between $15 and $25. Put the parts together, tighten the knobs and you're good to go.

In the Cessna 182 we tried the mount in, the iPad fit fine between the yoke horns, but it filled up the entire space. It blocked a sight picture of the lower panel, but this wasn't an issue on either the pilot or co-pilot side. But that's not to say there were no issues.

With the iPad (and the GPSMAP 696) in yoke mounts, control move-

AC TV

For a video comparison of the GPSMAP 696 to Apple's iPad, log on to www.avweb.com and select the video index in the upper right corner of the homepage. Scroll down to the iPad vs. GPSMAP 696 video.

CONTACTS

AirGizmos LLC
www.airgizmos.com
972-671-8001

National Products Inc.
RAM Mounts
www.ram-mount.com
206-763-8361

ment is noticeably heavy during take-off checks and depending on how they're mounted, they can bang into the knees, too. Knowing this ahead of time, you can get out of the way, but it's still an annoyance.

SEAT RAIL MOUNT

RAM also makes a unique seat-rail mount that clamps to the floor between the two seat rails. (Retail: $120.32) It's intended for Cessnas, but it would fit any aircraft with similar seat rail design—basically a small steel I-beam shape with holes drilled for the seat locking pins. As shown in the photo, the clamp works by inserting a tab under the top lip of the I-beam which gains purchase against the rail with a thumbscrew.

A flexible stalk—fitted with a rubber ball at one end—then threads into the clamp. In the Skylane, this places the iPad just above the seat level of the co-pilot seat. The stalk has a bit of sway to it, but it's basically a solid mounting method.

Still, there are a couple of concerns. First, the co-pilot will have interference with it no matter how far aft the seat is kept. And there's no chance of the seat being slid fully forward. This argues for the seat rail solution being best for the solo pilot.

Having the iPad mounted that low is an acquired taste, in our view. It's certainly viewable, but some might not like looking that far down for long periods. Last, it has to be positioned carefully to avoid banging it during a control check. The flex stalk helps.

SUCTION, GLARESHIELD

RAM has a couple of other options for light GPS units, if not the iPad. One is a glareshield mount that consists of a steel channel that slides over the lip of the glareshield and tacks in place with a couple of thumbscrews. (Retail: $35.84.) The socket arm then attaches to the rubber ball, thence to the GPS.

This is, in some ways, the ideal mount option, albeit one that can obscure the panel. However, the glareshield lip is too flexible to support much weight. It was just able to hold the weight of the iPad, but the 696 would be out the question. We're also not sure how secure this arrangement would be turbulence. It would be better suited to a lighter GPS, in our opinion. Although supporting it with a supplemental bracket might be an option.

Another mount we tried was RAM's suction base, which sells for $15.77. These consist of a suction cup with a mechanical cocking lever that pulls the cup firmly against a smooth surface, likely to be a windshield or window in the aircraft.

The suction is hell-for-strong and more than capable of supporting the iPad, although probably not the 696's 2.1 pounds. As with the glareshield mount, we're not sure how well it would hold in turbulence. Positioning on the window or aft section of the windshield is good for viewability, but does produce a blindspot for traffic.

KNEEBOARDS

We're aware of two kneeboard type products for the iPad, which take an entirely different tack on where to put this useful but a bit overlarge device.

In our review of the iPad in the

continued on page 32

AIRGIZMO'S PANEL DOCKS

The gold plate best solution to mount a portable GPS is to get it off the yoke and into the panel and that's what AirGizmo's well-designed panel docks do. A few years ago, these seemed like a novelty, but we're beginning to see more of them in both experimentals and in certified aircraft.

The basic idea is to carve a hole into the panel and insert the AirGizmo cradle, route the power and antenna wires in through the back and you're done—no wire tangle, no yoke interference and no giant invoice from the avionics shop.

Well, maybe. AirGizmo's Max Probasco told us that FSDOs have gotten more reasonable about approving the AirGizmo mounts, viewing them as a minor alteration not needing expensive DER work to approve. If the panel has open real estate for the cradle, it's trivial to install it. Most installations use the GPS's external antenna placed on the glareshield and power provided via the accessory plug, just to honor the spirit and letter of the "portable" concept.

The mounts are well made of UV-stabilized, durable polycarbonate plastic and some models can angle the display toward the pilot if the unit has to be placed on the far right of the cockpit.

Prices for the panel docks are a bargain, ranging from $39.95 for an iPod dock to $129.95 for the larger displays. And speaking of

large displays, there's no way you could ever find room for a GPSMAP 696 or iPad in a conventional panel, is there? Yes, there is, and AirGizmo already has a dock for the 696 and is working on one for the iPad.

We wondered how many owners can find the panel space for these large displays and the answer appears to be not a lot. Probasco told us the 696 dock is finding some traction, but by far the more popular seller is the GPSMAP 496, which offers a good combination of features in a smallish package. The panel dock for that device sells for $99.95.

Probasco didn't provide details on the iPad mount, other than to say the company hopes to have it available later this year.

REALITY CHECK

LSA Glass Cockpits: Worth the Expense

Given the go-places mission profile for modern LSAs, we think the payoff is worth the expense. The trick is choosing the best real-world capability.

by Larry Anglisano

When the FAA launched the LSA category a few years ago, the stated goal was to create a new level of simplicity, with lower acquisition and operating costs. Instead, pilots with a driver's license in pocket get wooed by gee-whiz panels and creating a feeding frenzy of upgrades that manufacturers are all too happy to provide.

Does all that fancy integration represent real-world benefits and value? We think so, but only if you can match the avionics to the mission.

WHAT'S YOUR LSA FOR?

The problem with spec'ing the avionics in most LSAs is it's easy to underestimate the mission. If you're certain that your flying days will be scaled back to local flights on Sunday morning, we think a high-end portable GPS, com radio and transponder will do the job. Who needs weather, terrain, traffic and autopilots for that?

But if you're on the fence about how you will use the airplane, go for the more-equipped avionics option. Retrofitting it later will burn time and money, and may not ever be possible given required supporting systems and accessories. You could end up trying to unload the airplane to get into a more advanced model. In the current sales climate, this is a losing proposition.

This is especially true for anyone stepping out of a capable all-weather, go-anywhere machine like a Bonanza or Centurion into a basic LSA. There's no doubt a LSA will limit your mission, but having a well-equipped machine with modern glass integration could be the difference between feeling underequipped or comfortably confident. It's easy to feel culture shock when stepping backward.

If the glass panels in the majority of LSAs offend your sense of low-and-slow nostalgia, we say: Get over it. If you want true nostalgia, we think your money is far better spent on a real-deal, well-restored antique. If you must have a new airframe with old-style round gauges, realize that resale demand at the price you paid will be virtually non-existent.

CHECKLIST

- ✚ Non-TSO'd gear means capability for less cash
- ✚ Proven, low-cost avionics make cross-country missions easier and safer
- ⛔ IFR flight in most LSAs is limited or forbidden

THE GLASS MARKET

Tom Peghini, President of Flight Design USA, told us that every time a higher-end avionics package is offered, nine out of 10 customers want it. Flight Design stopped even offering traditional instruments in 2008 when the CTLS model was introduced. These buyers aren't tech kids, either. The CTLS buyer base is 40-70 year olds.

Even J-3 Cub replicas are subject to the trend. According to Legend Aircraft, a large majority of their Cub buyers plan to use the airplane for going places. They don't care about glass when staying close to the turf strip, but when they wander off for that Saturday fly-in, they demand a panel full of avionics. Roughly 40 percent of buyers pick glass options in the Legend Cub.

It's easy to get sold on the safety aspect. It's easy to find yourself flying longer cross-country missions than you originally anticipated. It's also easy to become overconfident and toy with weather you really shouldn't be in.

HIGH BANG FOR THE BUCK

Some buyers perceive the latest portable GPS systems like the Garmin touchscreen aera and big-screen GPS696 as "glass cockpits," but they really aren't. An integrated glass cockpit includes a primary flight display (PFD) driven by self-contained or remote AHARS and interfaced with an autopilot/flight control system. There may be a separate multifunction display (MFD), or typical PFD/MFD functions may be combined on one screen. The displays may have an integral GPS system or be driven by portable or panel-mount GPS. Integrated XM weather and traffic alerting are also common.

Dynon is making a big noise with its new SkyView suite. This double-screen setup includes true ADAHRS with synthetic vision, engine instrumentation, brilliant screen clarity and back-up battery redundancy. Pricing seems too good to be true. In the 2010 Flight Design CTLS, this dual 10-inch SkyView panel (the same size as a typical G1000 screen) comes at a $12,075 premium. A single G1000 display costs more than that. The CTLS includes a Garmin GTX330 Mode S transponder with traffic, a Garmin GPS696 with XM weather and an Artex 406 MHz ELT system. For $5450 more you get a Digiflight two-axis autopilot with vertical speed control, and $3133 adds a Garmin SL30 navcom with glideslope. The total package costs $20,638 or about a 15-percent increase to the CTLS base price of $139,800. The Garmin G3X cockpit for the Legend Smart Cub adds a similar $23,000 to the Cub's base price, but there's no SL30 in that setup.

What does this get you in the real world? Huge amounts of situational awareness, autopilot comfort for long trips and limited instrument

QUIZ: WHICH PANEL OFFERS THE MOST CAPABILITY?

Well, that depends on what you want to do. The Evektor SportStar with TruTrak displays (top) may look the most sparse, but it's actually IFR legal (complete with gyro and electrical backups and pitot heat) and uses a GPS found in bigger aircraft. As a traveling or training machine, this panel can take you through the widest range of scenarios. It also has an autopilot integrated into the PFD. As an IFR training mount, the 430 is great, but we think the non-standard symbology of the TruTrak won't prepare students well for certified glass cockpits.

The Remos with older Dynon instrumentation and a Garmin 496 looks simpler, but wait: It offers datalink weather where the Evektor did not. The 496 also has easier to access and more extensive airport data for an unplanned stop. This stack has dual radios for com redundancy, one of which can be used for an ILS in an emergency. But that's emergency only as the manufacturer prohibits any IFR flight. It's also the only setup with full engine instrumentation in front of the pilot (although SkyView, bottom, can show a split screen).

The Flight Design CTLS with SkyView has the best situational awareness, both top down and forward, autopilot integration and three-way instrument redundancy if you count the GPSMAP 696 virtual instruments. The 696 offers gobs of airport and weather data as well as approach charts—but it's also the only navigator in this cockpit. You technically couldn't fly this bird under IFR even in VFR conditions. You also have to ask: "How many moving maps do you need?" This cockpit has three if you count the synthetic vision.

The point here is that more pixels don't necessarily equate more capability or ease of use. We think datalink WX, easily accessible airport data and emergency IFR capability are important. You need to know your mission and pick the package deal that hits all your must-haves for the best price. You may end up with extras because they came with the bundle, but that's better than finding you lack some function you later wish you had.

Case Study

THAT'S ONE SMART CUB

Rick Brown, who enthusiastically praises the glass cockpit in his airplane, despite not knowing what to expect when he sprang for the $21,980 option on the first Legend Cub with a Garmin G3X. "As far as ease of use goes, the G3X cockpit is a home run and I was comfortable with it within minutes … The only glass experience I had was using a couple of Garmin portable navigators including the GPS 696."

The G3X suite is related to the GPS 696 but it's really a derivative of the G300 found in the Cessna Skycatcher. The Cub has a single-screen PFD/MFD and engine parameter system with true AHARS. It also has synthetic vision. The G3X PFD/MFD combo sits front and center in the Cub's small instrument panel, and is saddled up to a Garmin-AT SL40 Com radio which will autotune frequencies from the G3X navigational database. There's also traffic data from a GTX330 Mode S with TIS traffic transponder.

But this only scratches the surface of the integration. The TruTrak GX autopilot is fully integrated with the PFD which has on-screen commands for lateral and vertical navigation, including vertical speed command. If the G3X were to fail, the TruTrak can still offer limited functionality. This is serious capablity.

Brown admits getting chided often on his decision to load all that glass in a Cub. While some of his buying decision was the result of a smitten relationship toward cockpit gadgetry, the package paid for itself on the maiden trip, a 1400-mile journey from the Texas factory to his hangar on Cape Cod, Massachusetts. He flew the airplane as most people would fly a Cub: low and slow in Class G and E airspace. But intended VFR conditions often turned marginal and having detailed navigational data, synthetic vision with terrain alerting, XM Weather, traffic alerting and a host of other belt-and-suspender data made deviations informed and easy.

While Brown didn't buy it as a traveler, his Legend Cub is proving to be a capable machine with its 300-mile range and smooth-running 100-HP Continental O-200 engine. Fit and finish of the airplane is simply outstanding, so it's a fine place to be as you tool over the countryside. Our only beef is the ability to easily remove and replace components of the G3X. The stuff is just packed in there. While this digital stuff is good, it's not bulletproof and we have the strained back to prove how awkward replacing a failed AHARS can be.

approach capability. In both these cases, the GPS source is not an IFR-approved navigator, so that's only for an ILS approach.

Tecnam Aircraft offers a Garmin GNS430W with GI106A indicator as a $16,500 option for its aircraft. There's also the Advanced Flight AF-3500 EFIS system with an angle of attack system, Garmin aera mounted in a AirGizmo Panel Dock that's part of the "Flight School Glass" package and carries a $14,000 premium. Here, we think the GNS430W option makes better sense for student training or personal travel if you're willing to push an LSA to approach-level IFR. For just an emergency out, a basic navcom with ILS capability would do the trick.

Is IFR legal in an LSA? For now, if it's equipped for such and the manufacturer doesn't prohibit it (note the double negative there), it's legal. There are also a select few LSAs (Tecnam, Evektor and AMD) that sell IFR models. These are deemed IFR by the manufacturer and have nothing to do with the regs for LSAs. They usually sport real IFR GPS navigators and niceties such as backup instruments, pitot heat and real alternators.

That said, most LSAs make poor instrument platforms due to near neutral dynamic stability and low wing loading. This is no fun even in VFR under-the-hood practice, let alone really getting inside a bumpy cloud. There's at least some value in using these airplanes to practice instrument approach procedures and for working on PFD scan technique. But if this is your driving reason for buying an LSA—and more than one LSA buyer and flight school has told us this is their plan—you'll need to accept several limitations.

Real-world IFR, even in practice, is becoming more and more driven by WAAS IFR GPS. It's not required for instrument training, but training without it leaves a gaping hole to be filled in when stepping up to bigger, more-capable aircraft

To legally fly GPS under IFR, even for just direct point-to-point navigation en route, and, technically, even IFR in visual conditions, the equipment and installation characteristics must fall under TSO C129 (non-precision GPS approach) and TSO C146A (WAAS vertical-guidance

	FLIGHT DESIGN CTLS			TECNAM SIERRA		LEGEND CUB (0200D)		
	DYNON D100, D120, GPS496, SL40 com, Mode C	DYNON 10-inch SKYVIEW, digiflight two axis A/P, SL30 Mode S	GARMIN G3X, GNS430W GPS/com, A/P, Mode S, SL30 nav/com, SafeTaxi	aera 560, SL40, PM3000 intercom, Mode C	Advanced Flight AF3500 EFIS, Trio Pilot Pro A/P	Analog altimeter, airspeed, inclinometer, analog engine gauges, Mode C	GPS696, SL40, GTX330, PM1200 intercom, Mode S, SafeTaxi	Garmin G3X with integrated autopilot, Mode S, SafeTaxi
VFR GPS	⊕	⊕	⊕	⊕	⊕	⊖	⊕	⊕
XM WEATHER	⊕	⊕	⊕	⊕	⊕	⊖	⊕	⊕
TRAFFIC ALERT	⊖	⊕	⊕	⊖	⊖	⊖	⊕	⊕
AUTOPILOT	⊖	⊕	⊕	⊖	⊕	⊖	⊖	⊕
VOR/ILS NAV	⊖	⊕	⊕	⊖	⊖	⊖	⊖	⊖
IFR GPS	⊖	⊖	⊕	⊖	⊖	⊖	⊖	⊖
DIG ENG MON	⊕	⊕	⊕	⊖	⊕	⊖	⊕	⊕
SYN VISION	⊖	⊕	⊕	⊖	⊖	⊖	⊖	⊕
DUAL SCREEN	⊖	⊕	⊕	⊖	⊖	⊖	⊖	⊖
BACKUPS?	Battery inside GPS	Dual ADHRS, Coms and screen, Internal EFIS Batteries	Dual Screens	Battery inside GPS	Internal one-hour battery	n/a	Battery inside GPS	Redundant power input
COST	$139,800	adds $20,638	adds $48,120	$144,999	adds $15,000	$113,895	adds $14,989	adds $22,000

approach). Portable GPS units which drive most LSAs are right out here. But even a fully certified GPS navigator must be coupled with a display that's on the navigator's AML-STC list. Deviate from this approved equipment list and the *installation* could be legal, but deemed VFR only. Also, if you're using a TSO C129 GPS, you're supposed to use a VOR receiver as a backup.

On the other end of the capability curve, we think glass makes sense even for the basic LSA cockpit. A Dynon D-series EFIS is cheap, capable and reliable. While you might never look inside during the day except for the occasional glance at altitude, the EFIS display could be a lifesaver if you get caught out on a dark, moonless night. A portable GPS in a Gizmo mount, a com transceiver like the Garmin SL40 and GTX327 transponder is a complete package for well south of $10,000. We think it's a good value.

UPGRADING AFTERMARKET

Upgrading an LSA in the field is an option. Anything goes for modern designs, as long as the installation is approved by the LSA manufacturer. The approval comes in the form of a letter from the manufacturer that becomes part of the aircraft's records, a sign-off of sorts. These approvals are usually far easier to get than a certified aircraft FAA field approval. So adding a GNS430W to a good used LSA is a viable option. Non-certified gear is fair game. Antenna work could be tricky for composite fuselages, so choose a shop with experience in this.

Sorting through all the options and costs can leave your mind spinning. But prioritizing your needs (such as the top four here) against the different options can help cut through the glitz and find the substance.

Significant upgrades to vintage airplanes like the classic J-3 Piper Cub and original Aeronca Champ is probably not worth it. They have limited equipment to start. There's limited space to house the accessories and effectively install antenna systems. Some might not have capable (or any) electrical systems. Panel space can be nonexistent. Stick with a quality handheld transceiver saddled up to an external antenna, and, if you're wandering far, a portable GPS.

CONCLUSION

When it comes to glass cockpit integration in LSAs, we're on board. The mission profile for most models includes at least some distance traveling through diverse airspace and terrain. While IFR-legal would be a nice plus for getting up or down through a high-ceilinged cloud deck, we'll stop short of recommending LSAs for serious instrument flying.

But dismissing information-rich display technology for the sake of keeping things simple is just silly, in our view. You can and should use this gear for tactical avoidance of weather and terrain.

If distance traveling is part of your mission, we suggest springing for an autopilot option that handles both pitch and roll. We can't label any given avionics suite a hands-down winner over another but we're impressed with Garmin's G3X. Its operating logic should be familiar to pilots who've used Garmin portable GPS. On the other hand, the new Dynon SkyView offers redundancy and similar functionality with much bigger screens.

One last thought: If you can still pass a medical and are torn between a high-end LSA and certified aircraft, it pays to shop the used market. You can buy a pre-owned G1000 Skyhawk for well south of $200K—or about the same price as today's well-equipped LSAs.

V-Tail Bonanza

Piper may have been first with an airplane for everyman, but the V-tail Bonanza put GA on the map with a high-performance and stylish traveling machine.

PHOTO BY GARY SHEPHARD

If Piper put general aviation on the map with the J-3 Cub, Beechcraft made it possible to actually go places on that map, thanks to the incomparable Bonanza. With antecedents dating to 1947, the venerable V-tail remained in continuous production until 1982, something no other model can claim.

The Bonanza's unique combination of good looks, cabin comfort, high performance and good load carrying capability earned it a loyal following that continues yet today.

Indeed, some owners say the early models are among the best values on the used aircraft market, but we urge a dollop of caution. Unless those 50- and 60-year-old airframes have been well maintained, they can be, in the words of one owner, a money pit.

But the good news is that there are plenty of "modern" Bonanzas to pick from and owners are rabidly loyal to these airplanes. Although not cheap to operate, they aren't unreasonable, either. Parts and support remain easily available, although owners concede parts can be expensive.

The V-tails suffered a bad rep thanks to a series of breakups during the 1980s, but these airplanes have been subjected to a Beech-developed tail beef-up kit that has all but eliminated the breakup issue.

MODEL HISTORY

The first V-tail Bonanzas were so ingeniously conceived that it appears they sprang from the mind of designer Ralph Harmon and others full-blown in the dim past of 1945. At the outset, the airplane was like nothing else on the market: fast and slick and great looking. The basic format was retained for decades through fine-tuning, strengthening and bigger engine iterations, yielding a plethora of model designations.

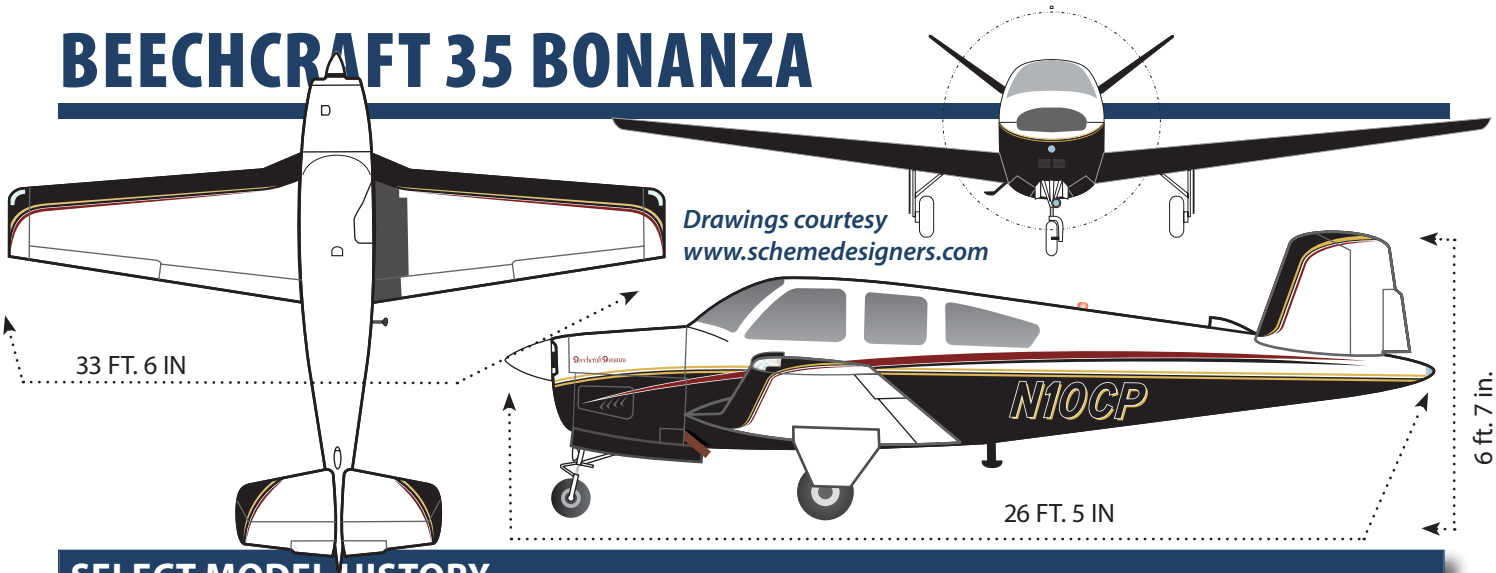
The basic formula was retained for years, with improvements yielding better speed, strength and utility.

In keeping with Beechcraft's reputation for excellence, the early Bo's got the benefit of wind tunnel testing and study to find ways to boost speed and increase safety, something not commonly done in the 1940s. This shows in the details, such as fully retractable tricycle gear, with no projecting bumps or humps as on some other aircraft and extensive use of flush-riveting. A unique fuselage design incorporates a sled-like keel arrangement and box structure to increase crashworthiness. This structure extends into the engine compartment, with the motor mounted on keel extensions, making it easy to access for most maintenance operations. Huge side windows were hinged at the top with quick release openings at the bottom to allow easy escape in an emergency, a side benefit that was blessed forever afterward by rear-seat passengers.

STRAIGHT 35

The first so-called "straight 35" model Bonanza had a 165-HP Continental engine that produced an amazing 175 MPH at cruise speed. These models are among the cheapest Bonanzas on the market these days, but we would counsel potential buyers to be cautious. Unlike later models, the straight 35 lacks a shear web in the main wing spar—a design strategy undertaken to save weight. And although Beech offered a "35R" wing strengthening conversion in 1951, there weren't many takers for the expensive mod (then $6000, compared to the cost of a new C35 of only $12,990). Beech

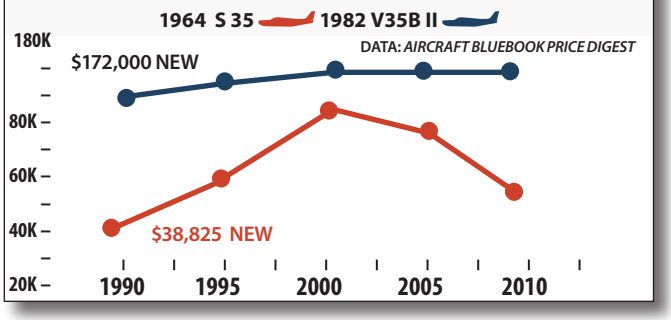
BEECHCRAFT 35 BONANZA



SELECT MODEL HISTORY

MODEL YEAR	ENGINE	TBO	OVERHAUL	FUEL	USEFUL	CRUISE	TYPICAL RETAIL
1947-1949 BONANZA 35	CONT. 185-HP E-185	1500	$30,000	39/60	1092 LBS	150 KTS	±$18,000
1949-1950 A,B 35	CONT. 185/196 HP E-185B	1500	$30,000	39/60	1075	148	±$20,000
1951-1953 C,D 35	CONT. 205 HP E-185-11	1500	$30,000	39/60	1050	152	±$23,000
1954-1956 E,F,G 35	CONT. 225 HP E-225-8	1500	$30,000	39/60	1053	160	±$32,000
1957-1960 H,J,K,M 35	CONT. 240/250 HP O-470	1500	$30,000	49/70	1118	170	±$43,000
1961-1963 N, P 35	CONT. 260 HP IO-470-N	1500	$30,000	50/80	1270	170	±$49,000
1964-1965 S 35	CONT. 285 HP IO-520-B/BA	1700	$30,000	50/80	1385	178	±$58,000
1966-1967 V 35	CONT. 285 HP IO-520-B/BA	1700	$30,000	50/120	1485	177	±$66,000
1966-1967 V 35-TC	CONT. 285 HP IO-TSIO 520-D	1400	$30,000	50/120	1450	195	±$75,000
1968-1969 V 35 A	CONT. 285 HP IO-520-B/BA	1700	$30,000	44/74	1440	177	±73,000
1968-1969 V 35 A-TC	CONT. 285 HP IO-TSIO 520-D	1400	$30,000	50/120	1373	200	±$80,000
1970-1976 V 35 B	CONT. 285 HP IO-520-B/BA	1700	$30,000	74	1450	172	±$92,000
1977-1982 V 35 B	CONT. 285 HP IO-520-B/BA	1700	$30,000	74	1450	172	±$120,000

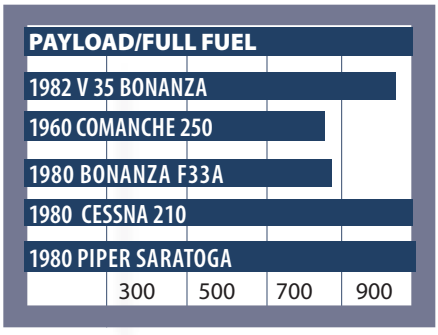
RESALE VALUES

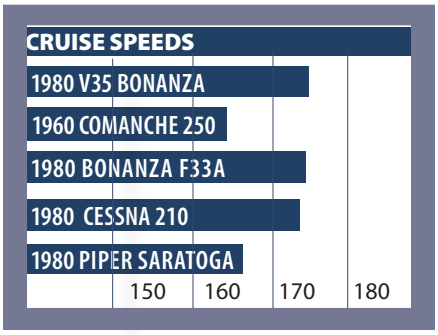


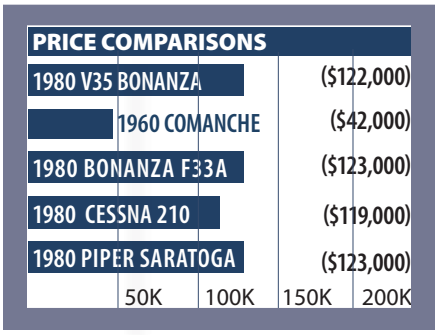
SELECT RECENT ADs

AD 97-06-11	RUDDERVATOR CONTROL ASSEMBLY
AD 94-20-04R2	REVISED TAIL MODIFICATION
AD-76-05-05	STABILIZER ATTACH FITTING
AD 75-15-08	ENGINE LUBRICATION
AD 72-11-02	ENGINE FUEL INTERRUPTION

SELECT MODEL COMPARISONS







Todd Quesnel's nice 1979 V35B shows what can be done in the panel of a modern Bonanza. One limitation, however, is that the main avionics stack is generally installed to the far right—not ideal, but workable.

offered a number of wing mods and there was an after-market mod called the Jourdan-Flannagan mod.

We advise avoiding these but if you're considering one, the American Bonanza Society believes they can be operated safely if you do your homework. That means a careful pre-buy inspection and a checkout that emphasizes operating limitations.

With the succeeding A35, Beech made important strengthening improvements, added a new wing carrythrough structure and thicker wing skins and fuselage stringers. They beefed up the fuselage bulkhead at the tail attachment. On the B35, a slight power boost during takeoff of 11 HP was engineered through slightly higher RPM.

With the C35, major changes were made to the stabilizer. The chord was increased by 14.4 percent and the dihedral increased slightly in an attempt to reduce yawing. The chord increase was made by simply extending the leading edge, but leaving the front spar where it was.

This created a greater overhang forward of the spar that would figure in tail-twisting during in-flight breakups and would later be secured by a bracket after a big FAA/Beech investigation into the breakup problem.

With the E35, buyers had the option of a 225-HP Continental engine. Also, aileron trim was added for the first time and backseat passengers got a couple inches more leg room. The magnesium flaps were replaced with aluminum ones. In the G35, the wing was beefed up once again. And gear extension speed went up from 125 to 140 MPH, the first in a series of speed boosts that would make the landing gear an effective speed brake.

MODERN BONANZAS

The H-model represents what Larry Ball in his book, *The Incomparable Bonanzas,* calls the beginning of a second generation of Bonanzas. The airplane got a bigger 240-HP powerplant which, for the first time in the line, offered identical takeoff and max continuous horsepower. This was the first wet sump design for the Bonanzas, allowing oil to be carried internally rather than in a separate oil tank, thus simplifying the plumbing somewhat. Additional strengthening was also added to tail, fuselage and wings.

The major change on the J35 was a switch to a 250-HP fuel-injected engine. On the K35, the standard fuel capacity was boosted from 40 to 50 gallons, which with the 20-gallon aux tanks gave 70 gallons and moved the airplane up into the serious cross country machine it is today. Also, an optional fifth jump seat was offered, allowing more chances to load aft of the weight-and-balance envelope. Throw it away is our advice and many owners seem to agree.

Elongated, curved rear side windows were added to the N35. Horsepower went up to 260 and fuel capacity rose to 80 gallons, while the number of fuel tanks was reduced to two. This was done by offering optional 40-gallon tanks in place of the standard 25-gallon tanks. Along with "full time" fuel quantity gauges provided to both tanks, fuel management was simplified, a good safety feature.

The addition of new, long leading edge fuel tanks displaced wing landing lights, which in turn were moved to the nose and nose gear strut, where they remain in modern designs. Landing light bulb replacement is thus among the easiest of all GA models. Pilots concerned with tracking troublesome magnesium components might also note the ailerons were converted to aluminum, thus easing repairs and repainting somewhat.

On the used market, the P35 is one of the best values, perhaps because it got a completely redesigned instrument panel, with the famous "piano keyboard" switch arrangement of the early models abandoned in favor of conventional switches, albeit not always located in the best places along the lower panel eyebrow. The P-model saw a higher landing gear extension speed, up from 140 to 165 MPH. Although the P-model was a large step forward, Beech had even bigger ideas.

The S35 Bonanza got a 285-HP powerplant and a longer cabin with a new aft window shape like that found on Barons. The aft bulkhead was moved back 19 inches and although this made for a comfy cabin, it planted the seed of what has become a chronic complaint among Bonanza owners: aft CG. To address that in the S-

model, Beech added a 25-pound lead weight to the nose for balance.

Theoretically, the S-model was a six seater. But not really. It's just not practical to stuff passengers back there, unless they're lightweight kids. The larger baggage compartment door is a nice plus, however. Visibility out front improved with the V35 model as a one-piece windshield was made standard. And on the V35A that followed, a bigger, swept windshield was added that allowed more space behind the instrument panel for maintenance.

A V35TC turbocharged model was added to the line for the first time, also. Normal gear-down speed went from 165 to 175 MPH. The big safety improvement on the V35Bs was tgw addition of anti-slosh fuel cells to prevent inadvertent unporting during slips, skids and turning takeoffs, a shortcoming that had caused mishaps. Some models carry placards advising of minimum takeoff fuel, but many have anti-slosh baffles to address this.

The way it used to be, top right photo. That's the panel in Marty Noonan's 1950 B-35. Before there was a throwover yoke, there were dual yokes. Note the classic piano key switches on the lower panel. Lower photo shows Noonan's newer ride, a 1970 V35B with tip tanks that boost gross weight to 3600 pounds, up from 3400 pounds.

PERFORMANCE

Bonanzas are famous for their speed and justifiably so. With the largish engines and relatively low drag, owners report cruise in the 150- to 175-knot range, depending on engine power. The real eye opener with regard to raw speed is the conversion to an IO-550, which a number of owners have done.

That speed comes at a price, however. Like Mooneys and other high-performance airplanes, the Bonanza is slick and will build speed quickly in a dive or an upset, thus it requires attention from the pilot in instrument conditions or potentially moderate turbulence. Bo pilots are wisely taught the desperation tactic of lowering the gear to arrest an out-of-control dive or unusual attitude.

Anyone who has stepped into a Bonanza from another model is immediately impressed with how well the V-tail (and straight-tails) handle. The controls are silky smooth and light with nearly perfect harmony between aileron and pitch pressure. However, the stick-forces-per-G are also light, which means that the ham-fisted pilot has less margin in turbulent air. Even with the tail mods, the airframe can still be bent.

As with any high-performance airplanes, landings require good speed control. Although they can be done power off, most pilots seem to fly the approach with just a bit of throttle to improve ruddervator response and avoid sink fests. Consistent, smooth touchdowns are achievable but, more to the point, really screwing up a landing in a Bonanza is hard to do. It doesn't have the Mooney's vicious porpoise or the Saratoga's tendency to plop.

What it does have is the famous Bonanza tail waggle in turbulence, which is bound to make backseaters with tender stomachs somewhat queasy. Oddly, many believe the tail waggle is unique to the V-tail, but the straight-tail 33s have it too. Some owners ignore it; some say a yaw damper is required equipment.

WEIGHT AND BALANCE

Apart from the tail waggle, passengers give Bonanzas high marks. For one thing, there's plenty of shoulder and head room; the interior feels more like a 1950s Chevy than the cramped interior of the typical high-performance single. The front seats are relatively upright and comfortable, but lack much forward and rearward adjustment. Leg room is adequate in both front and rear seats. By GA standards, the giant windows give unmatched airiness and visibility, especially out the rear side windows and forward through the windshield.

When carrying passengers, Bonanza pilots learn to brief them carefully on closing the cabin door. Most pilots do it themselves, for if not properly secured, the door is almost certain to pop open on rotation. It's not an aerodynamic hazard to further flight ,but can be dangerously distracting.

The aircraft's loading Achilles' heel is its relatively narrow weight-and-balance envelope, a peccadillo owners bitch about. Even without big-butted passengers, it's easy to load aft of the rear CG, a potentially nasty situation in any airplane, but doubly so in one with controls as light as those on the Bonanza.

And on later models, as fuel burns out of the leading edge wing tanks, the center of gravity shifts farther to the rear, aggravating the situation. V-tail Bonanzas have generally stricter rear CG limits than the straight-tail models, which means that the same load will put you a lot closer to the aft limit in a V-tail.

MAINTENANCE

Buyers should be alert to three main problem areas: Damaged control cables, rods, fittings, malfunctioning, out-of-order landing gear components and corrosion. The landing gear and corrosion problems can be especially expensive to repair. There were also quite a few reports of corrosion in the aft fuselage section—many uncovered during the thorough inspection

If you can't afford an IO-550 conversion, the next best choice is the IO-520, found in the S-model forward. For the power, it's one of the most economical GA engines available.

required by Beech Aircraft Corp. as part of the tail-brace installation. Obviously, the tail fix will have been completed more than 20 years ago, but that doesn't mean corrosion will stop. The airplane should be inspected carefully.

Proper ruddervator balance has always been a critical matter on the V-tail Bonanzas to prevent flutter or vibration, which can contribute to severe structural damage and even inflight break-ups. We found at least four of these incidents in our recent scan of accidents. The balance margin is so narrow that unbalance could—and has—resulted from repainting the ruddervators without rebalancing afterwards. Most shops know all about this but some still make the error anyway.

Corrosion is often encountered with magnesium components like the ruddervators and on some Bonanzas, the flaps and ailerons. But check other components as well, as the Bonanza fleet ages. Some corrosion may have been well hidden. The 35 series is not exactly slammed with ADs, but a prospective buyer should check the list carefully, especially the tail fix AD.

MODS, OWNER GROUP

A lot of mods are available for Bonanzas, from STOL kits (Sierra, www.sijet.com) to engine swaps (D'Shannon Aviation's IO-550, www.beryldshannon.com), to speed brakes (Precise Flight, www.preciseflight.com) to TKS anti-ice systems from CAV Aerospace at www.weepingwings.com.

D'Shannon also offers vortex generators, which are a worthwhile investment. Speaking of things worthy, The American Bonanza Society (www.bonanza.org) provides a good-looking four-color magazine, plus lots of technical advice. It sponsors pilot training and maintenance clinics around the country through its affiliated Bonanza Pilot Proficiency Program.

We would consider membership in this group a must for Bo owners, but especially any owner new to the airplane. Contact The American Bonanza Society, P.O. Box 12888, Wichita, KS 67277, 316-945-1700 or www.bonanza.org.

OWNER FEEDBACK

I purchased a 1979 V35B in 2007. She has been a wonderful airplane to fly and extremely reliable. If you are thinking about stepping up to a Bonanza or any other high-performance aircraft, make sure you are ready to make the jump. The Bonanza is an aircraft that you have to stay in front of and one that is less forgiving than the Warrior/Skyhawk herd.

The airplane carries 80 gallons (72 useable) and you can count on burning 15 gallons per hour rich of peak. ROP operations will typically allow me around 4.5 hours of flight time; lean-of-peak operations can push this to 5-plus hours. The airplane climbs with one on board at 1500 FPM to about 3000 feet and then about 1200 FPM to about 6000 feet. At cruise altitude, you can count on truing at 171 knots on 14.5 to 15 GPH, rich of peak.

The aircraft is a solid IFR platform and has yet to disappoint. The addition of Garmin GNS430Ws and the MX20 Chart View coupled to the autopilot have greatly reduced workload and allows me to concentrate on cockpit management rather than focusing on a set of gauges.

The Bonanza is a slippery aircraft and once you point the nose down, it tends to easily accelerate into the yellow arc. When I first started approaches, I typically flew them at 70 to 80 knots. I will approach closer to 120 knots now, as I have grown more comfortable with the speed of the aircraft, slowing for a touchdown at 70 to 80 knots. The Bonanza seems to handle crosswind landings with little struggle.

The operating costs for the aircraft are not out of this world. The insurance my first year was a bit high at $3200, but has since come down to $2200. The annuals average about $3000. One thing about the Bonanza that I noticed, and maybe it is true for all Beechcraft, is that they don't break

TALE OF THE TAIL

V-tail Bonanzas from the C-model forward should have the stabilizer leading edge cuff, right lower photo. Nonetheless, logs should be checked and the airplane inspected. This is a critical modification that essentially ended the V-tail's breakup history. Second, owners must religiously adhere to Beech guidelines for control cable tension and ruddervator balance, lower left. Although breakups are a rarity these days, ruddervator flutter or vibration isn't, especially in older models. Further, we recommend caution when flying in the yellow arc. Avoid doing it in turbulence.

photo courtesy Henry Valentino III

Older V-tails like Zac Armstrong's 1956 G model are bargains on the used market and they're good performers. But owners say avoid getting into one that will require a lot of expensive fix up, as many do.

often but when they do, prepare to write the check.

Useful load is about 1100 pounds; with tip tanks, this increases another 100 pounds. I currently have an IO-520-BB and I have given thought to a 310-HP IO-550. The V-series has been plagued with a CG issue which cannot be ignored. You must be mindful of how you load the aircraft as the CG shifts to the aft in flight as fuel is burned. Be careful how many of those large suitcases you stuff back there.

Overall, the V-tail is a quality aircraft and a solid IFR platform. I would highly recommend it.

Todd Quesnel
Houston, Texas

I have owned a 1967 V35 since June, 2006. I have added 425.7 hours to the tach since that time. About a year before I purchased "Alphaba" (after my favorite "Wicked" character, "Elphaba"), the local FBO had completely rebuilt the airplane for another customer, adding a zero-time IO-550, Hartzell Scimitar prop, backup alternator, Beryl D'Shannon tip tanks, a Garmin GNS530 with XM weather and traffic, S-TEC 55, Sandel 3308 and a new paint job.

My airplane will fly at a top speed of 177 knots burning about 17.5 gallons per hour with wide-open throttle. Since that's obviously not a cruise configuration, I set high-speed cruise at 75 percent power to run 169 knots at 16 GPH or 65 percent power for 157 knots and 13 GPH.

I have loved the way V-tail Bonanzas looked since I was 10 years old and saw the first one of them at Dress Regional Airport in Evansville, Indiana. Since obtaining my license in 1973, I had hoped some day to own one. My favorite things about this particular model include the wonderful Garmin GNS530 set-up, the outstanding autopilot and the tip tanks. Although I haven't needed it in IFR, the back-up alternator provides reassurance, too.

My Bonanza carries full fuel and four passengers or three 190-pound men with golf clubs and luggage with no problem. The extended range tanks have let me easily fly five-hour legs from St. Petersburg, Florida to Columbus, Ohio, or from Bangor, Maine, to Columbus with adverse winds.

The only major unplanned expense I have seen was the $8000 tab to reskin the magnesium V-tail surfaces, due to a bit of pitting. Otherwise the airplane has been quite solid and reliable and a pride to own.

Ken Deken
Willoughby, Ohio

I've owned a 1979 V35B since 1992 and have flown it nearly 2500 hours throughout the U. S., Canada and the

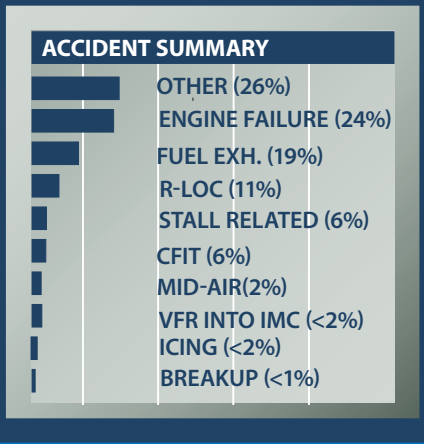
ACCIDENTS: A MIXED BAG, TAIL ISSUES

The V-tail's safety history is, to engage in restrained understatement, somewhat checkered. Although it has receded in the memory of many, the 35 series suffered a serious breakup problem between its introduction in 1947 and the imposition of the AD-mandated tail fix in 1987. An astonishing 240 V-tails were involved in breakup accidents during this period, an average of one every couple of months.

The problem: When Beech extended the chord of the rear stabilizer beginning with the C-model by simply moving the leading edge forward, twisting forces were introduced that exceeded the structure's load capability in certain flight modes, generally limited to higher speed flight, but still below redline.

When pilots got themselves into this corner—often because of turbulence or excess speed—the tail could fail catastrophically during recovery, with inevitably fatal results. After first denying the problem and even suing the Department of Transportation over the release of findings of post-certification wind tunnel testing, Beech conceded a problem and developed a stabilizer strengthening kit in 1987.

The so-called cuff kit slips over the front of the stab fins and beefs up the structure ahead of the spar. All V-tails from the C-model forward should have this cuff. If you find one that doesn't, don't consider it for purchase. Although we still see occasional V-tail breakups, these always appear to be because of excursions outside the airplane's legal envelope.



But one thing we continue to see is ruddervator flutter/vibration incidents. During our most recent sweep of accidents that occurred between 1995 and 2010, we found four of these, one on a newer V35B. None were fatal, but all significantly damaged the aircraft. V-tails have always been sensitive to imbalances in the ruddervator surfaces and incorrect tension in control tables.

In one flutter incident, the NTSB said the airplane's controls were correctly set up and although the pilot was flying in the yellow arc, he appeared not to have exceeded the top of the arc. Advice: On any V-tail, ruddervator balance and cable tension is deadly serious. Make sure it's done right.

Otherwise, the V-tail's safety record is remarkable only because miscellaneous causes seem to dominate the pattern. Interestingly, runway loss of control incidents rank fourth as a cause, behind engine failures and fuel exhaustion or mismanagement. In most models, R-LOC is the number one cause of accidents.

But give the V-tail credit for being easy to land, even in crosswinds or on slick runways. Fuel exhaustion or mismanagement is high as an accident cause in the 35 series. We found a handful of accidents where the pilot ran one tank try with usable fuel in the other tank. The 35's fuel system is not complex, but the tank switch is located out of view behind the pilot's left leg.

In the "other" category were six gear-up incidents. Three were genuine I-forgot-the-wheels accidents, three appeared to be collapses after landing. This used to be more common, presumably because in early models, the gear and flap handle location were opposite from the industry standard, with the gear on the right, flaps on the left. Newer Beech products adopted the standard configuration, but data from the American Bonanza Society suggests this had no effect on gear-up incidents.

Bahamas. My Bonanza's capabilities, in terms of comfort, handling and mission, exceeded my expectations.

Prior to owning the Bonanza, I flew a Mooney as part of a club. In my opinion, the Bonanza exceeds the Mooney in comfort and performance, as well as value when considering the resale and operating cost of comparable model years. I did look at upgrading to a Baron at one point, but after my mechanic showed the maintenance bills of a friend's 1979 BE55, it was clear that cost of operation would triple for the sake of a few knots. I decided to pass on the Baron.

Mods include the Mike Smith gap seals, yaw skeg and tail bulkhead plus D'Shannon IO-550B and baffles with GAMIjectors. Rich of peak, I true at 180 knots with a fuel burn of 17 to 18 GPH. While lean of peak, I typically see 172 knots at 12 to 13 GPH. On an IFR trip last February from Sarasota, Florida, to Suffolk, Virginia, we departed just ahead of a SR22. While we both chose the same altitude, there were never any ATC spacing issues with the SR22 in trail. After landing, it was interesting to see that I needed 50 gallons to his 60 gallons.

Operating costs average about $15,000 per year and based on an average of 100 hours a year, flying it rounds out to about $170 an hour. Annuals have averaged about $2700 for the past three years and insurance at $2500 for $2 million smooth and $150,000 hull value.

Joe Palazzi
Wallingford, Connecticut

We have owned our 1956 G35 Bonanza since 2008. Prospective buyers must first realize the first Model 35 Bonanza is a much different aircraft than the last V-tail that rolled off the assembly line in 1982.

From the first Model 35 through the 1956 G35, the airplanes were powered by the Continental E-series engines. While these engines require special care and knowledge to operate, they are capable machines once the idiosyncrasies are mastered.

The E-series-powered aircraft originally came with the Beech Model 215 electric propeller. While some owners have had great luck with this system, the majority of the aircraft have been converted to a Hartzell constant-speed propeller, which has an AD inspection

required every five years if equipped with the MV clamps (most are). The cost of this inspection is similar to an overhaul and we consider it a fixed cost. Not only does the Hartzell propeller require the inspection, but the associated external plumbing and parts make the engine compartment quite tight to work on with regards to the rear-mounted accessories.

The initial purchase price of these E-series aircraft can be comparable to aircraft with substantially smaller cabins and less performance and usually range from $40,000 to $60,000. Annual inspection costs range from $1000 to $1800 a year when no major discrepancies are found.

After our airplane was purchased, it immediately required overhauls of almost every accessory due to the age and disuse. We found that once we started to replace one item, the next thing needed to be replaced and so on until we had a failure of the T-drive, which powers the fuel pump and prop governor.

This caused metal parts to find their way into the engine and a teardown had to be conducted. Overhauls of the E-series engines can be expensive, with parts and knowledgeable mechanics hard to find, although they are still readily available.

Now that we have repaired our aircraft and made it reliable, it is truly a great cross country machine. We consistently see TAS between 140 and 150 knots with a fuel burn of only 10 GPH. The wing seems happiest between 8000 and 10,000 feet in cruise, although with the lower horsepower engines, climb rates suffer compared to the higher horsepowered brethren.

Useful load is just under 900 pounds and with full fuel (53 gallons), we can still hoist just shy of 600 pounds. Loading flexibility is afforded with the auxiliary fuel tanks available in some variants of the E-series aircraft, which hold 19 gallons of useable fuel.

For those owners who want to get a lot of aircraft for the money, this aircraft is it. Its cabin dwarfs anything with a comparable cost and its passenger comfort is second to none in its class. With the engine turning at 2300 RPM in cruise, the cabin is reasonably quiet and well ventilated and the aircraft exhibits true Beech quality.

As with any aircraft, a thorough pre-buy, information from the American Bonanza Society and a general knowledge of what you are getting is a must, because a poorly maintained example of this aircraft can be a money pit. Once you find a well-maintained aircraft, however, it will treat you well and really take you places on a budget.

Zac Armstrong
New Braunfels, Texas

I flew my first Bonanza 35 in 1971 when I returned from Vietnam. I was an Air Force pilot and my dad had a 1950 B-35 that he used in his business. It had the upgraded E-225 engine (225 HP), electric prop, Osborne tanks and a 10-gallon aux tank for a total fuel load of 90 gallons. It cruised between 140 and 150 knots on 8 GPH. It was a pleasure to fly, very light on the controls and balanced, but the bench seat did not move fore and aft so I was a little cramped.

In 2002, I bought my own 1950 B-35 Bonanza, which was the last B model produced and was the last of the short-chord 35s. It also had the E-225 engine and electric prop and M-35 wing tips. The 35B is comfortable for four adults and small bags for three- or four-hour flights.

I decided to look for a newer 35 and found a 1970 V35B in Tucson with everything I was looking for and purchased it in 2004.

The V35B is an excellent cross country aircraft, especially with the tip tanks that add an additional 200 pounds to the maximum gross weight (3400 to 3600 pounds) so they essentially carry their own weight in fuel.

I run the engine lean of peak, which gives me 12 gallons per hour at 156 to 160 knots. The longest leg I've flown her was 7.2 hours non-stop IFR, but the average leg is 4.5 hours. The versatility of the 35 is that it can be used as a high-speed cross country cruiser, or power back to 7 or 8 gallons for the pancake breakfast run or local sightseeing flight.

I compute about $140 to $150 per hour to operate the airplane, which includes fuel, maintenance, insurance and P & I on the remaining loan. Annual inspection runs between $1500 to $2500, depending on which parts need replacement.

Marty Noonan
Amery, Wisconsin

The Aviation Consumer

GPS Mounts

(continued from page 19)

July 2010 issue, we mentioned a metal kneeboard design from www.forpilotsonly.com that resembles one of those aluminum folding clipboards flight schools sometimes use to keep track of aircraft hours. The iPad slips into the metal housing and a hinged cover folds open to allow access. To write on a pad, you close the cover to protect the iPad. We found it performed as advertised, but it doesn't help much with the annoyance of having a large thing in your lap during flight. In some aircraft, it may interfere slightly with lock-to-lock yoke movement.

As we go to press, the company has released a new and improved model called the iPro Aviator which works on the same design principle, but appears more refined and has a molded back to fit the leg. It sells for $149.95.

Another solution for the kneepad arrangement is another new iPad product called the MyClip Thigh available from www.tietco.com. This one is the essence of simplicity. It's just an elastic strap with two clips that fit to either side or the top and bottom edge of the iPad. As we go to press in early October, the device is just going into production. For $39.95, we would deem it to be a good value if the kneeboard option appeals to you. (It doesn't to us.)

CONCLUSION

Coming full circle here, the iPad is simply too big for the small cockpit, but it's not too big to adapt to it. It simply requires some compromise and getting used to. Where to place it—or the GPSMAP 696—is a matter of personal taste and tolerance. Our preferences rank like this: RAM's yoke mount, the seat-rail mount, no mount at all and, last, the kneeboard option. There's nothing wrong with either of the kneeboard designs; we just don't like larding the cockpit up with gadgets to write on when a simple paper pad or Post-it note will do. Your tastes may dictate the opposite opinion.

Best of all worlds for either is AirGizmo's panel mount, but this will be a daunting challenge for either of these large-display products in a certified airplane. It may be impossible to find enough panel real estate without the ruinous effort of rearranging the primary stack. And after all, the iPad is supposed to be a sophisticated, low cost option, right?

MyClip Thing, left, clamps the iPad with an elastic strap and two soft clips.

FEEDBACK WANTED

CESSNA 340

For the February 2011 issue of *Aviation Consumer,* our Used Aircraft Guide will be on the Cessna 340. We want to know what it's like to own these practical cabin class 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 Cessna 340 by December 1, 2010, to:

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

Letters

(continued from page 3)

and I think all the basic Cherokees use the 4509, but I'm not positive.

Sam Buchanan
Prescott, Arizona

The PA-28s do use the GE 4509. As we noted in the article, our view is that no STC or PMA is required and our advice is to simply buy the LED you like and install it. In any case, at press time, Whelen contacted us to report they have received STC approval for the Parmetheus lamp. It's available from Aircraft Spruce.

And by the way, our article offered two spellings of Whelen, but the one with two e's is the correct version. We apologize for the lapse.