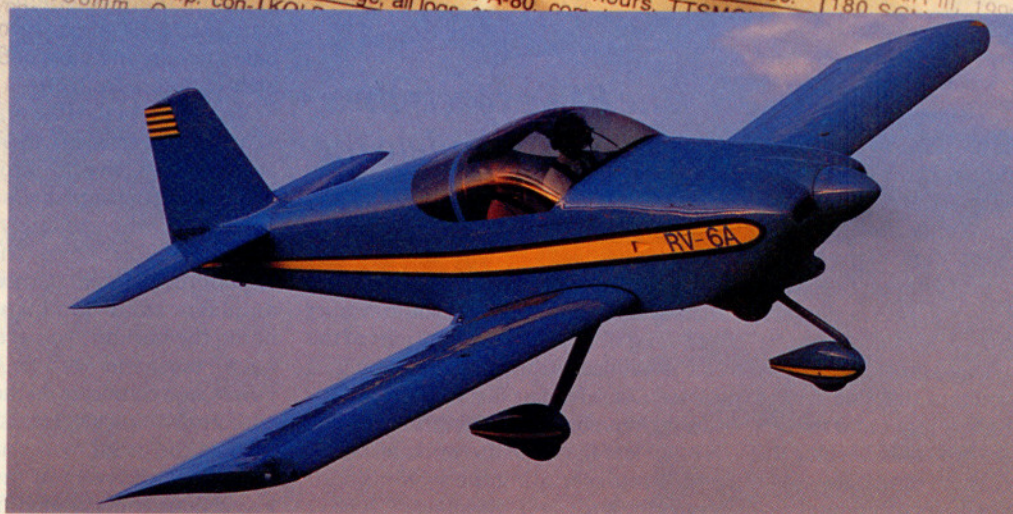


KIT-BUILT CONUNDRUM



When walking the used-homebuilt tightrope, keep your eyes wide open.

BY MARC E. COOK

IF life in general aviation is reflected in the yellow pages of *Trade-A-Plane*, as some pilots maintain, then homebuilt airplanes have truly come of age. No longer relegated to the back pages of the classifieds—almost an afterthought—experimentals now reside with the big boys, right in there between Ercoupe and Fairchild. And if the placement alone isn't particularly telling, then the nearly 240 listings in a recent issue for completed airplanes, partially finished projects, and parts ought to tell you that homebuilts are no longer the lunatic fringe. ■ Poring over those advertisements can be thought provoking, too. Listed in a recent *TAP* were airplanes ranging from “professionally built” Glasair IIIs to Fly Babys and virtually everything in between. If a kit or set of plans has seen any kind of popularity in the past five or 10 years, it's a good bet you'll find one for sale. ■ Some of the ads might tempt the fence-sitter into the experimental-aircraft fold. As an acquaintance told me, “There's nothing wrong with these kit air-



planes that not having to build them wouldn't cure." For a price, it seems, you could have nearly all the advantages of a kit airplane—the beauty, the speed, and the individuality—without having to construct it.

Were it only that simple. Buying a completed or partially finished kit- or plans-built airplane has been described as walking a half-inch rope across a half-mile-wide Dante-esque fire pit of doom. Make it to the other side, and you'll be richly rewarded, but wear your asbestos jammies just in case. Let's not understate the issue by making light of it: Many of the homebuilts for sale today are real beauties, meticulously crafted and certainly safe. But there are also a few that are poorly built and untested, and there's the whole in-between—airplanes that could have bank-vault-tight fuselages and mare's nests for systems. They could become the incautious buyer's worst nightmare.

Before you buy an experimental airplane, you need to know who built it and why. Much ado has been made of the "hired gun" builders. There are several levels of aid available to kit-airplane builders—from the fellow who runs a "builder's assistance" shop where several of the same model go together with owners doing most or all of the work, to small-scale manufacturers who produce turnkey airplanes. In the latter case, the owner's involvement is strictly financial.

Professionally built experimental airplanes, though usually works of aeronautical art, run contrary to the spirit and intent of the rules. The Federal Aviation Administration has set aside the Experimental—Amateur-built certification method for "education and recreation" purposes. The FAA expects the builder to complete the "majority" of the work, widely construed as being 51 percent of the effort. Recent fast-build kits have stretched this definition, and many FAA regional offices con-

...with SEW, enhanced the
...struction. Beautiful interior and more. Priced to sell at max.
\$115K.
ROTORWAY EXEC. 141TT elastic metric hub, rotor
chain, 152 engine, Terra 720 Combs, professionally
built, Canadian registration, will take aircraft on trade.
\$29,000.
NEW 1992 KIT-FOX III with IV wing, windshield and
flaperons, 20 gallon fuel, new radios, A&P shop bu-
...and other notions. Stits tan, brown and burg.
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The FAA expects the builder to complete the "majority" of the work.

sider the 51-percent rule by task rather than by total time. That is, if you construct one wing rib, the "education" part of the rule is fulfilled as though you had built all 30 ribs. Consider, too, that in many sophisticated homebuilts, finishing the airframe is often less than half the work; installing and troubleshooting the systems consumes the rest.

If you are contemplating buying an airplane built by one of the pros, be sure you understand the category in which it's certified. If you really build one yourself, you get an airplane in the Experimental—Amateur-built category. Some FAA offices look the other way at these pro builders and issue the amateur-built certificate even if the real owner did little more than write the checks.

Other FAA offices, however, require that the airplane be registered as Experimental—Exhibition. Usually, such a designation carries serious limitations on the use of the airplane. It can be flown at air shows where it will be exhibited, for example, and for flight testing, for purposes of transporting it to and from exhibit locations, and for pilot proficiency. This last category is where most pilots expect to regain the utility inherent in the amateur-built certificate, but don't believe that an Exhibition-registered air-

plane can be used just like one with a Standard-category or Experimental—Amateur-built airworthiness certificate. This is still a small segment—compared to the more than 14,000 aircraft having Experimental—Amateur-built certificates, only 2,700 are on record with Exhibition tickets, and most of those are warbirds or restored antiques.

Regardless of the fine print on the airworthiness certificate, you as the new owner will not have the same authority in maintaining the airplane as did the original builder, who can apply for a limited Repairman's certificate. This allows him to perform all maintenance and sign off annual or condition inspections. Not being the builder, you are required to have a mechanic with an Airframe and Powerplant certificate do the work, just as with production airplanes. You can still take on the usual roster of owner-performed maintenance tasks, but the inspections and any modifications must be made by someone approved for the task. And finding an A&P familiar enough with homebuilts can be a daunting task; many don't want their signatures anywhere near a kit-built's logbooks.

Cautions apply to buying into partially completed kits. Check with your local FAA office, so you can get an official determination of how much of the airplane has been finished and how much you will get credit for. You want to be listed as the sole builder, and that means completing 51 percent of the work. Be sure, too, that the individual who started the project kept good records of the process because the FAA will want to see documentation for all the work performed on the kit. Also, try to divine the builder's reasons for selling. Some just don't have the time or money to complete a long-term project, while others get frustrated with the seemingly snail's pace of building. Those in the latter camp might have tried to cut corners to

speed the process, a dangerous and counterproductive move. Be sure you're not buying any of that.

Let's assume that you are interested only in a completed airplane, one with a valid Experimental—Amateur-built airworthiness certificate and all its flight-test time flown off. (The FAA specifies 25 hours for airplanes with approved engine/propeller combinations and 40 hours for uncertified engines or unapproved engine/prop combinations.)

If you have your choices narrowed to a particular make, your first stop should be to the factory that made the kit. Here's where buying an airplane whose maker is still among the living can pay big dividends. At the factory, you can fly (for a price) an example of the airplane, as well as obtain the builder's manuals and a listing of service bulletins and letters—remember, there's no official airworthiness directive system for experimentals. Most kit makers also encourage prospective second (or subsequent) owners to fly several examples of the breed. Because we're dealing in truly hand-built (and often, shall we say, personally engineered) airplanes,

variances in flying qualities are tremendous. One man's Hotshot XL may handle like a dream, while another's turns corners like a garbage truck on flat tires. If you fly only one, you'll never know where it lies in the continuum.

You should take the factory's information, and go find someone in the building process. Learn how the airplane is supposed to go together—in short, become an expert. If that's not your bailiwick, then find someone who is an expert to come and inspect your potential purchase. Such an individual can be found through your local Experimental Aircraft Association chapter or by recommendation of the factory. Also, most of the completion centers will provide prepurchase inspections.

Before you ever set seat in a fellow aviator's homegrown project, you should complete a thorough—and we mean exacting, microscopic—preflight inspection.

This preflight starts not from the outside, but at the airplane's innards. Forget that the paint might be immaculate, or that the simulated mohair interior is just the bee's knees—what you're looking for is structural integrity and adherence to the plans under the skin. Remove as many access panels as you can, including as much of the interior as practical. Understand that many kits aren't designed for the same kind of maintainability as are production airplanes, so you might not get to see as much as you'd

two people, land where you never thought you could. \$9995.
EMERALUDE GP-305, 690 TTAFA&E, 116HP Lycoming, Intercom, King KY97, KT76A, w/Mode-C, \$12,500.
MOTORGLIDER 1987 MONI, 155TTA, 2 SOH, all metal, tinted canopy, ext. ant., 25 HP elect start, fly it home, no medical necessary, no tows, \$7900.
SCORPION 133, LOW HOURS, 133 h.p. Rotorway engine, new composite blades, mint condition, asking \$11,000 OBO.
BABY LAKES, PITTS

Learn how the airplane is supposed to go together.



like. The builder should have a thick photo book on the project, which will help fill in the blanks—if the documentation is sketchy, look elsewhere.

It helps to have studied the construction manual beforehand because you will be looking for how well the builder stuck to the plans, as well as for overall craftsmanship. Ask what kinds of modifications the builder has made and why he has done so. If you get an earful of "oh, the factory doesn't know what it's doing; everyone knows the spar bolts ought to be twice that size," consider another airplane. Though the kit builders are part of a still-young industry, most popular kits are reasonably well engineered from the start, and major structural modifications not officially condoned by the kit maker will throw all of the structural and aerodynamic assumptions from the original design right out the window.

Determining the quality of the airframe work can be difficult or easy, depending upon the construction materials. Metal airplanes are fairly straightforward—look for pulled or working rivets, crushed ribs or stringers, and evidence of corrosion. Still, poor workmanship can lurk under the surface, just out of sight. If you're not knowledgeable on metalwork, take along someone who is; there have been stories of gorgeous homebuilts whose main-spar rivets all were improperly bucked.

Tube and fabric airplanes can be inspected with conventional means, as

well. Watch for good welding of the main structure and appropriate hardware and its safetying. Airplanes like the Kitfox and Avid Flyer come with all the welding done at the factory, which greatly improves your chances of finding a good one.

Composite airplanes are a different story, however. You can check the integrity of the bonds by tapping on the surface with a coin. A sharp "thwack" indicates good structural integrity, while a hollow "thunk" could point to a void. But this method is anything but foolproof, and the size of the air bubble or degree of delamination must be great for the coin-tap to work. The best bet is to remove as many inspection panels as you can and take a very close look at all the layups for air bubbles or dryness. Most of the popular composite kits use foam-core pre-impregnated fiberglass cured in an oven (Lancair, KIS, and Pulsar) or room-temperature-cured wet layups (Glasair). Most parts of the structure are complete from the factory, and what you're looking for is how those panels are assembled. Also, make sure any damage has been repaired correctly.

Inquire if the builder has implemented the latest parts in the kit. Some designs begin to show weaknesses only after several ships hit the skies—typically items like weak bolts in landing-gear assemblies but also some major problems. If the builder took his kit off to East Nowhere and never talked to the factory

from first rivet to first flight, you might end up with a handful of obsolete parts.

Be extremely wary of unapproved engine installations. Usually, a kit maker specifies a choice of engines, within a fairly narrow power range. If the airframe was intended to carry 160 horsepower, be very cautious of one with 250 hp shoehorned into its snout. Also, check to make sure the engine has the correct accessories like magnetos, fuel-injection or carburetor setup, and propeller/governor combination. Builders have pursued the mix-and-match method, often with poor results.

While you're poking around under the cowl, take a very close look at the engine installation. Pay special attention to the mounting structure and fuel system—these are two areas that have historically caused problems in homebuilts. You should also look for appropriate fire shielding and well-sealed baffling. Ask to see the engine logs, as well. Some thrifty builders purchase high-time engines and rebuild them on their own—all perfectly legal—but not the best or most confidence-inspiring deal for the second-hand buyer.

According to the kit makers, most builders do fine with the structure but occasionally do horribly on systems. Primary among the maladies is the electrical system. One kit maker cautioned that there are really no two airplanes alike with regard to electrics, and troubleshooting such an airplane can be extraordinarily

frustrating. When you inspect the airplane, try every bit of equipment aboard, and make sure it works as intended. In composite airplanes, pay special attention to the radios. Setting up an avionics suite in a plastic airplane can be difficult; poor grounding and ineffective antennas are common problems. Installing a full radio stack can call on knowledge and experience beyond that of most builders.

Then there's price. Given the wide range of quality and equipment, it's virtually

impossible to set hard-and-fast rules. As with most things, the homebuilt is worth only what you're willing to pay for it. A call to the kit factory might get you a price range, but each airplane should be valued on its own merits, in terms of the build quality, equipment, engine condition, and so on.

By far, the best advice to come from the industry is this: Be cautious, become an expert on the type, and look at a lot of airplanes. The used-homebuilt market is blooming, but it's up to you which of these dream machines is ripe for the picking. □



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Inquire if the builder has implemented the latest parts in the kit.

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