



Lancair



flying *new* types

IT'S ALL ABOUT THE BASICS

BY BUDD DAVISSON

AVIATION *has a problem.*

This time it's not money. It's not politics. It's not regulations. What it is, is an overall, insidious degradation of basic flying skills.



IT HAS BEEN HAPPENING FOR A LONG TIME, *and it's hurting sport aviation.*

HOW DO I KNOW THAT? Because over the course of nearly 8,000 hours' dual given, I've been checking out pilots to fly all manner of sport aircraft, Cubs to Pitts to Midget Mustangs to whatever is out there. Almost all of my "students" are certificated pilots seeking to make the leap from "normal" general aviation aircraft to those "sport" type aircraft that camp under the EAA banner. And, almost regardless of these pilots' flying background, their basic flying skills are such that some sport aviation airplanes will present a larger challenge than they'd have to meet within the general aviation population. That's not necessarily because their instruction is subpar. It's just that a Katana, 172, or anything similar isn't going to prepare a pilot for many of the aircraft that are the basis of sport aviation.

WHY SPECIALIZED TRAINING?

For the purposes of this discussion we're defining "sport aircraft" as those which fall under the EAA umbrella: homebuilt and vintage, which has the subcategories of antique, classic, and contemporary. And the question being asked is, if "normal" flight training isn't adequate by itself to fly some sport aircraft, and the basic skills of many pilots have eroded, is flight training available to prepare pilots to safely fly those birds that fall into each of these categories? The answer is yes. And no.

For some of the homebuilts, the RVs for instance, there are specialty instructors available who do their training in RVs. For aircraft like Stardusters and Thorps, this usually isn't the case. For classics like Cubs, Champs, and their ilk, yes, there are those who do that kind of training. For the antiques, say a Waco QDC or Pitts, you'll have to dig to find a qualified instructor. For the contemporaries, most of which are similar to modern aircraft, you would think adequate training would be available, but in some instances, that may not be the case.

One of the strongest arguments for specialized training for sport aircraft is that "normal" FAA-blessed flight schools don't offer that kind of training. That's not their purpose. In fact, it could be argued that, while the pilots coming out of those schools are safe to fly modern aircraft similar to those they trained in, they are babes in the woods when it comes to some types of sport aircraft. This is because modern certified aircraft, especially trainers, are known quantities: The FAA certification process makes them that way. When a pilot climbs into a Cessna/Piper/Beech/Diamond/Cirrus, although each has its own idiosyncrasies, within certain limits they still fly essentially the same. More than that, their designs are such that pilots' basic skills can be weak, and they'll still be safe because the airplane will try to take care of them. However, homebuilts, antiques, the classics, and even some of the older contemporaries are different breeds. Even a flight instructor with 1,000 hours in something like a Katana or Cirrus is unlikely to have the skill set to safely fly something like an RV (even a nose-wheel version), Cub, or Staggerwing. And a tailwheel endorsement won't make up the difference.

THE PROBLEM IS OFTEN THE BASICS, NOT THE HARDWARE

The laws of physics don't change for anyone. Not for Burt Rutan, Beechcraft, or NASA. However, aircraft to aircraft the interpretations of those laws do change, and the handling characteristics can vary wildly. At the same time, however, the very basic, rudimentary piloting skills involved in flying still apply, regardless of the airplane. In some cases, that's where the problem lies. It is very difficult, for instance, to teach the need for rudders in controlling adverse yaw or P-factor in aircraft where the engineers have designed most of those effects out of the aircraft in favor of ease of handling.

In the vast majority of sport aviation-type aircraft there has been little or no attempt to eliminate any of the aerodynamic gotchas that every propeller-driven airplane includes. It is the rare vintage or homebuilt airplane, for instance, for which the aerodynamics have been dumbed down to minimize such things as adverse yaw or P-factor. It is an eye-opening experience for someone with only Cessna or Katana flight time to do nothing more than make a turn in an Aeronca Chief (the king of adverse yaw), or perform a full-power climb-out in a Pitts and try to keep the ball centered. Basic skills are required across the board regardless of airplane type, but the newer and more "normal" the aircraft, the less that is so. And it shows.

NO, WHAT IS MISSING?

Excuse me if I indulge in a purely personal observation, but in looking back over hundreds, maybe thousands, of past students, almost all of whom were certificated pilots, I can easily see a distinct commonality of those skill nuances that they're missing. For some pilots, all of the areas listed below are weak, while most pilots are weak in at least a few of them. It is true that only a few of these skill lapses are truly troublesome in flying general aviation aircraft, but in some sport aircraft, they can cause serious heartburn.

Don't Truly Understand What the Rudder Is for. This is a super-common problem evidenced by pilots holding rudder or aileron while established in a turn or while climbing/gliding with the ball well off-center, thereby compromising efficiency and directional control.

Looking at the Nose Without Actually Seeing It. This is another way of saying their attitude control is approximate, rather than precise, because they don't see the small changes in the nose's position relative to the horizon so speed control becomes a continuously moving game of tag.

General Lack of Precision. For many pilots, everything that is quantifiable, from pattern altitude to approach speed, is approximate with no effort at holding exact numbers. This is a mindset, a general outlook, and not a skill. It affects every aspect of flying.

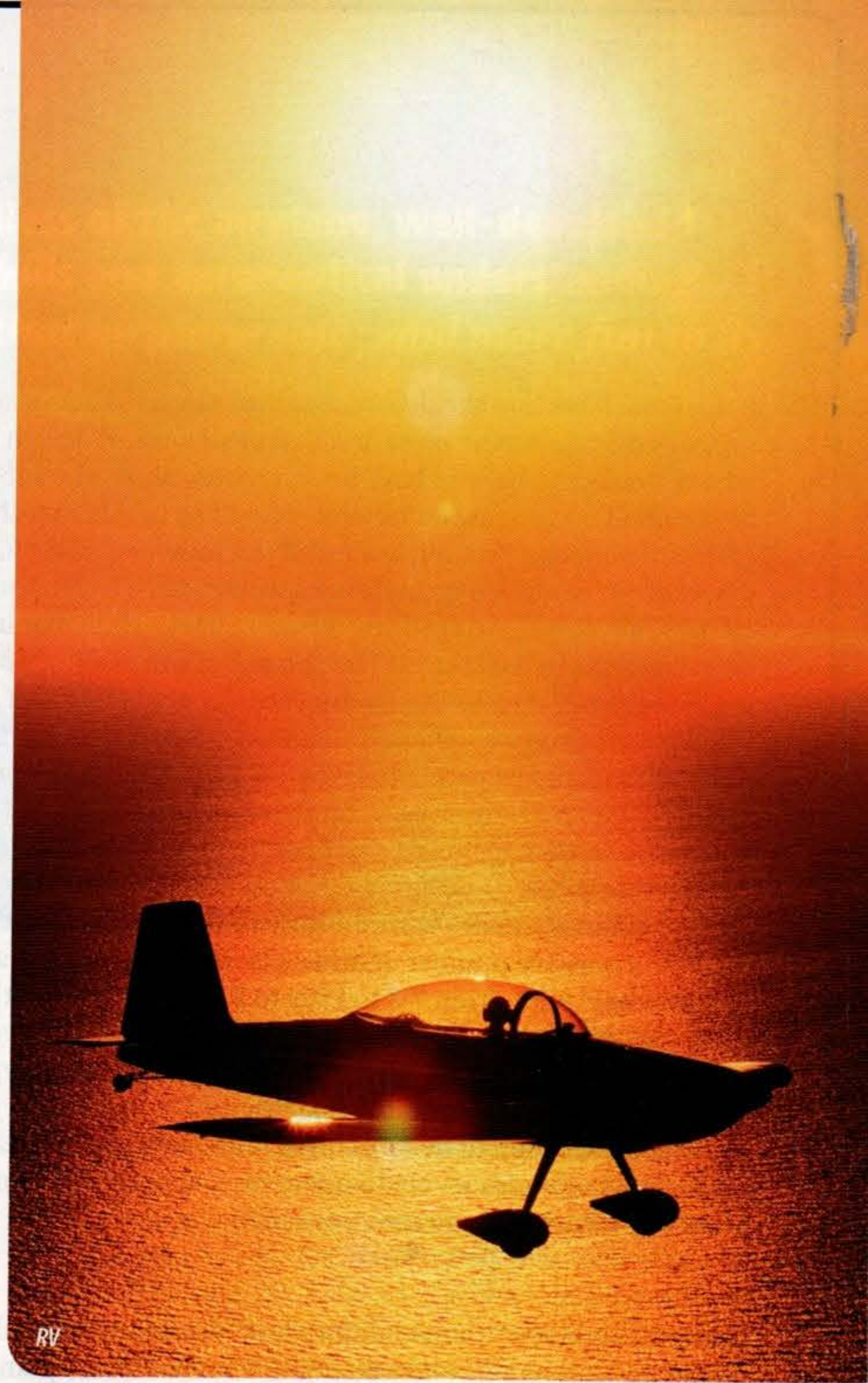
A General Lack of Aerodynamic Understanding. Such things as the buildup of drag with increased lift of any kind for any reason is not part of some pilot's thought patterns. There is also often a lack of understanding of the speed/g relationships that can breed unsafe situations at either the high, or low, speed ranges. So many aerodynamic basics aren't truly understood.

A Lack of "Feel" for the Airplane. Too often an airplane is viewed as a mechanical device, rather than being an art form that uses nothing more than invisible air to add a third dimension to our lives. If an airplane is seen and treated only as a machine, the pilot will never experience the wonderful feeling of being one with flight. They'll simply be a lever puller. A button pusher.

Limited Planning Ahead. The old platitude that says "Never let your airplane go anywhere your brain didn't arrive at first" is at the core of aviation safety. To get where you're going, you need to visualize where that is and what it takes to get there. It makes no difference whether it is over the horizon or on the other end of final approach.

Total Dependence on the Engine for Approach. You can always count on your dog, but the same can't be said of your airplane's engine. Yet, pilots will habitually set up a long, power-on approach knowing that if the engine fails, they are in deep guano. Pilots who don't do enough power-off landings (assuming they can be done in their airplane) to have developed the judgement this kind of landing engenders will be nothing more than passengers when the engine actually quits. And they do quit!

No Overall Sense of Awareness. There is an entire world outside of the cockpit. Yet, some pilots act as if their world is defined by their instrument panel. A continual scan of the world outside, from behind one wingtip to behind the other catching the panel on the way and noting as many details as practical, makes pilots aware of their place and progress.



'NORMAL' VS. SPORT AVIATION

Exactly what differentiates "normal" general aviation airplanes from sport-oriented types, and why do I say the basics are more important in the sport arena? That's difficult to answer concisely because the world of the sport airplane is not only huge but different airplanes in different parts of that world will have differing levels of "differentness." In addition, those differences may affect different parts of the pilot's skill package at differing times. Is that different enough for you? So, we'll divide and conquer by wading through the various EAA classifications (homebuilt, vintage, etc.), pointing out the differences to be expected and the types of training that may be needed.

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FIRST: ABOUT THOSE PESKY TAILWHEELS

Before we delve into the different categories and aircraft types, let's spend a few minutes discussing the most dreaded of all aircraft design features: the tailwheel. Books can be, and have been, written about the subject, but they can all be summed up in a few quick sentences. The first is that there is a huge amount of misinformation floating around about tailwheels. In fact, no one viewed tailwheel airplanes as being anything special until early in the 1950s because almost *all* prior airplanes had the little wheel in back. Then manufacturers saw the nose wheel as a way to sell the "If you can drive, you can fly" concept. It is worth noting that the majority of the landing accidents in tailwheel aircraft can be traced back to a crooked or drifting touchdown, which sets a series of events in action that are then poorly handled. If the CG is on the line of travel and there is no crosswind, there is no reason for the taildragger to turn. This, however, comes back to basic airmanship. It's difficult to make a square, no-drift touchdown if the pilot lacks the coordination to fly a clean approach.

Yes, taildraggers do require a little more training but it's well worth the effort because a massive number of otherwise unavailable aircraft become available to the tailwheel pilot, from J-3 to Pitts to P-51. Fortunately, there are a number of flight schools that specialize in tailwheel training. However, make sure you go to one that will give you a well-rounded experience on all types of runways in all kinds of conditions. The experience should be more than just what is needed to get you safe enough to fly on calm or wind-on-the-nose days. A few extra hours in challenging winds on challenging runways are well worth the time and money. It's the best insurance you can buy.

HOMEBUILTS

As soon as you say "homebuilt airplane" some people quake in their boots, but others nod knowingly and ask, "Which homebuilt airplane?" The latter are those who understand that the world of homebuilt airplanes is at least as wide and varied as the general aviation community itself. Maybe more so. They range from super slow (Pietenpols) to super fast (Glasair III). The big difference between homebuilts and others is that there is no guarantee how any one of them will compare to civilian airplanes because they weren't designed to the same specification template, FAR Part 23.

Something that can be said about many of the newer generation homebuilts (RVs, GlaStars, Lancairs, Bearhawks, Zeniths, etc.) is that their designers, being professionals, do pay homage to the FAR standards in making their designs suitable for public consumption. However, most include a strong flavoring that adds just a little "bite" (read that as "fun") to the recipe. Few homebuilts can be considered our granddad's Buick Roadmaster, which can easily be said of many general aviation airplanes. Many homebuilts can be seen as Corvettes (or Ferraris), and it's this sports car attitude that can come as a surprise to some folks.

Any RV, for instance, is a superb handling airplane, but its quicker (delightfully so!) control response and much smaller size will initially challenge a Piper or Cessna pilot. It'll take only a few training flights with an experienced instructor for any strangeness to disappear. However, without that training the possibility of over-controlling at a critical juncture exists. And there's no excuse not to get that kind of training because the new homebuilt rules allow giving training in non-certified aircraft. Plus, almost all major kit manufacturers can hook a builder up with an instructor or two who specialize in their airplane. The best training of this type, however, doesn't focus only on the way to fly that particular airplane. Hopefully, the check pilots make the flights a form of flight review in which the pilot's basic skills are sharpened and then applied to the airplane in question.

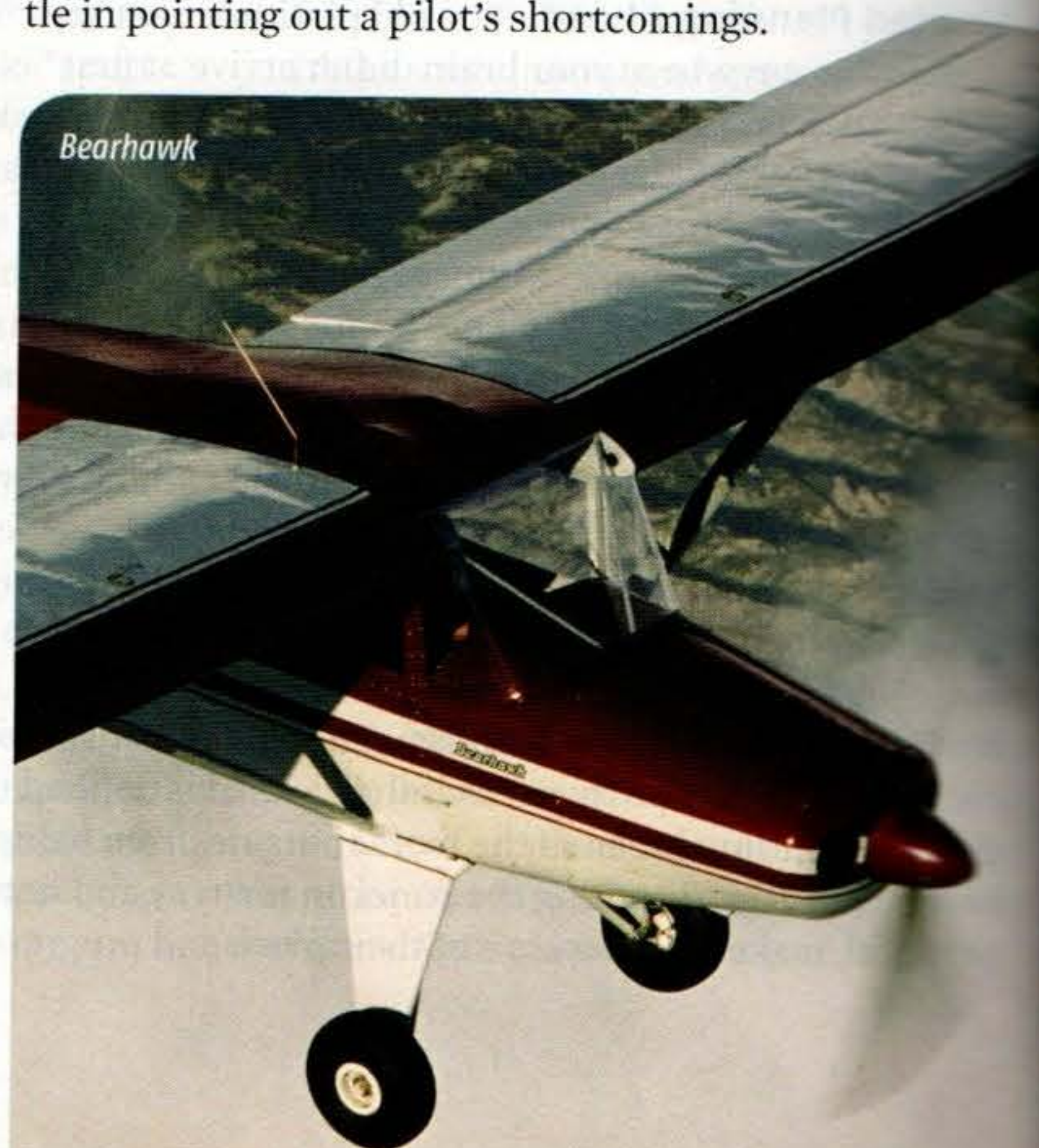
'EQUIVALENT TRAINERS'

For the less numerous homebuilt designs for which there is no factory training support, there are civilian aircraft that can give a similar experience, and a good instructor can translate what the student is seeing in the trainer to what they can expect in their own airplane.

The old Grumman AA-1 Yankee series of aircraft handle very much like RVs, Thorps, and most of the other quicker monoplanes. They are responsive and nearly duplicate the steeper-than-average power-off glide slope of the homebuilts. Unfortunately, it's hard to find a training school actually using them.

At the opposite end of the performance curve are the low and slow designs like the Pietenpol/Baby Ace, etc. The good news here is that Cubs, Champs, and even Citabrias, which are operated by any number of flight schools nationwide, will give the new slow-motion homebuilt pilot a good basis to build on.

For fast-moving taildraggers, the two-place Pitts Specials are readily available just about everywhere in the country for meeting that oft-feared moment when they have to be landed. This is another of those old wives' tales. Airplanes like Midget Mustangs, Pitts, Skybolts, Stardusters, etc. are not the terrorizing experience the homebuilt pundits say they are. They do, however, absolutely demand training, and the two-place Pitts, combined with the right instructor, is the perfect trainer. It gives ground-handling experience as well as acclimating a pilot to a lack of visibility over the nose and, when compared to most homebuilts, produces a pilot that is over-trained. Come close to being able to land a Pitts and the other types are easy. At the same time, the basics of aviating will become abundantly clear to the newbie because the S-2 Pitts is anything but subtle in pointing out a pilot's shortcomings.



Regardless of the airplane, well-developed basic skills and aeronautical understanding make that airplane safer and more fun to fly.



Zenith

VINTAGE

When talking about vintage aircraft (antique, classics, and contemporary), we're actually talking about everything from the dawn of aeronautical time to what amounts to yesterday (1970). During that 60 years, certification standards changed dramatically, and more importantly, the market's idea of what is acceptable changed. For that reason, while there is little difference between a contemporary aircraft of 1970 (think C-172) and today's aircraft, comparing a 1920s antique aircraft to a 1960s contemporary is a study in aeronautical progress. While the basic skills apply across the entire spectrum, the further back to antiquity we go, the more noticeable the absence of basic skills will become and the more likely a detailed checkout will be required.

ANTIQUE — DECEMBER 17, 1903, THROUGH AUGUST 31, 1945

There are actually at least four generations of "antique" aircraft, and the handling of each is different. The aircraft of the "teens," like a Jenny, have handling that can only be described as leisurely and rudimentary. During that time, the concepts we take for granted, like ailerons, powerplants, and overall control balance, were under development, and there is a gross difference between a 1910 Curtiss, a 1917 Curtiss Jenny, and a 1920 anything. Little about their stability and control requirements will be recognized by a modern-trained pilot. 1920s aircraft, on the other hand, would be more familiar, although still very demanding of stick and rudder skills. 1930s aircraft show the thought and development that makes them still viable in today's world, and they include newborns like the Luscombe, Cub, Taylorcraft, and Ercoupe that survived World War II to become postwar classics.

CLASSIC — SEPTEMBER 1, 1945, THROUGH DECEMBER 31, 1955

The decade right after WWII saw the continuation of some prewar designs, but the 1946-48 over-production of new light aircraft designs (C-120/140, PA-16/17, Swift, Champ, etc., most of which took years to sell) form the basis for much of on-homebuilt sport aviation today. The classics, through the 1950s Tri-Pacers and C-170s, outnumber just about any other segment of the sport aircraft population, although RVs may now outnumber them.

The new postwar designs all feature improvements in handling and design refinements, but they still demand that basic stick and rudder flight skills be applied. Keeping the ball centered in the interest of improved controllability and

safety asks that the pilot knows when, and how, to use the rudder. Then there is that tailwheel thing, which calls upon those same feet to handle two-directional control in variable conditions. The tailwheel classics (120/140, PA-16/17, C-170, etc.) are far from being difficult to land but encourage a pilot to pay attention in the touchdown phase of the landing. The basics apply. The nosewheel classics (Ercoupe, Tri Pacer, etc.) will let the pilot survive less-than-wonderful touchdowns but would still reward the pilot for good basic skills in the air.

CONTEMPORARY — JANUARY 1, 1956, THROUGH DECEMBER 31, 1970

The contemporaries bridge the gap between old and new. This group includes C-172s, Cherokees, Bonanzas, and so many others that are still stage center on the general aviation scene. In only a few instances do they present challenges that modern pilots can't handle with their present skills with a detailed checkout. Also, most of the marques are represented by type clubs in through which specialized instructors are readily available.

THE BOTTOM LINE IS 'BASICS'

Regardless of the airplane, well-developed basic skills and aeronautical understanding make that airplane safer and more fun to fly. The next time you're in the air, be your own toughest critic and see exactly what you're doing right and what you're doing wrong. Just that little bit of introspection will make you a better, safer pilot. And it's free! **EAA**

Budd Davisson is an aeronautical engineer, has flown more than 300 different types, and has published four books and more than 4,000 articles. He is editor-in-chief of *Flight Journal* magazine and a flight instructor primarily in Pitts/tailwheel aircraft. Visit him on www.AirBum.com.