



Buying *and* Owning *your own* Airplane

4th
Edition



James E. Ellis

Buying and Owning Your Own Airplane

Fourth edition

by James E. Ellis

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Dedication

This edition is dedicated to all the pilots and aircraft owners who have kept flying in the face of difficult economic and regulatory conditions, especially those who have spent hard-earned money to upgrade and keep their aircraft looking good and safe. And to all of the pilots who have maintained their stick and rudder skills and still hand-fly their airplanes because they love flying. And finally, to my wonderful wife Susan Sparks who tolerates my flying and spending money on the Cherokee 180C I have owned for more than 35 years.

About the Author

James E. Ellis is a retired Air Force Reserve lieutenant colonel and systems engineering manager who formerly supported Air Force programs at Hanscom AFB, Massachusetts. With over 2,800 flying hours logged, he holds a single-engine commercial land and sea license with an instrument rating plus a commercial hot air balloon rating. He has flown nearly 300 different aircraft including the Piper Cub, most of the Piper Cherokee series and most Cessna single-engine aircraft, as well as new types including the Lancair Columbia, the Cirrus SR20 and SR22, the Diamond DA-40, and more than a dozen different Light Sport Aircraft. He has owned and flown a Cherokee 180 for 38 years. He conducts EAA Young Eagles flights to inspire a new generation of pilots. Now retired from hot air ballooning after flying balloons for more than 25 years, he has flown hot air balloons at festivals in the U.S., Canada, France and New Zealand. He also lectures, writes for a monthly aviation newspaper, and serves on the Aero Club of New England Cabot Award selection committee.



Not many pilots have owned an airplane longer than the author has owned N9040J. (Photo courtesy Leo Hickey.)

Author's Note

This book is sold with the understanding that the author is not engaged in the manufacture, sale, inspection, or maintenance of aircraft, or in rendering legal or other professional services. If expert assistance in the selection and acquisition of an aircraft is required, the services of a competent professional should be sought.

The purpose of this book is to complement, amplify, and supplement other texts and sources. Anyone contemplating the purchase of a new or used aircraft should familiarize themselves with all appropriate materials, include Federal Aviation Administration Service Difficulty Reports and Airworthiness Directives, the manufacturer's service bulletins and other publications, information on the specific make and model of the aircraft from the Aircraft Owners and Pilots Association, and from clubs and associations devoted to the dissemination of information on that type of aircraft. And no one contemplating the purchase of an aircraft should ever purchase it without a complete and thorough pre-purchase inspection by an FAA-licensed mechanic.

Every effort has been made to make this book as complete and accurate as possible. However, some errors and omissions may still exist in this text, and this book can only contain information on general aviation aircraft and the aviation marketplace that was up-to-date at the time of publication. The author accepts no liability for any person or entity with respect to any injury, loss, or damage alleged to be caused by the information contained in this book.

Preface

The author's Prefaces to all editions of *Buying and Owning Your Own Airplane*, from the first through this current Fourth Edition, are included here.

First edition

Systems engineers like to approach major decisions systematically. You gather all the data you can, study it, organize it, analyze it, prioritize it, and eventually reach a conclusion. When the thought occurred to me that I could actually go out and buy my own airplane, I quite naturally attacked the problem with a systems engineering approach. I wasn't about to spend thousands of dollars without having some idea of what owning an airplane was all about.

I ended up reaching an unexpected conclusion. The only good information on the subject of buying and owning an airplane existed in magazine articles. No good books. Just magazine articles. Sure, books on the subject were available. They told me how to buy the airplane. Owning it? Maintenance? Government paperwork? Forget looking for that information!

Five years and three airplanes later, I was tired of giving other pilots the same repetitious advice about owning an airplane and I decided to write it all down. This book is the result. It is intended to cover all of the pilots who dream of owning their own airplanes. It's intended first and foremost for the average student or private pilot who is slightly bewildered by it all, who doesn't realize how much there is to know, and who can't pay cash for a brand new Bonanza!

Second edition

Ten years after the first edition of this book was published, I realized that my vision had been too narrow. When I first wrote the book, my methodical systems engineering approach told me that I could never afford a fast, powerful, retractable aircraft. So in a perverse kind of reverse snobbery, I excluded a whole category of wonderful aircraft.

I've learned over the years that if you really want something enough, you can make it happen. If you have a dream, you can make it a reality. The new version of *Buying and Owning Your Own Airplane* doesn't neglect the little guy who wants more than anything else to fly. It just recognizes that

even the pilot who aspires to own a modest little airplane may someday aspire to something bigger and faster...and that he or she will make it happen if the dream is vivid enough!

Third edition

Big changes had happened since the second edition had been published. None was bigger than the growth of the Internet and its entry squarely into the lives of almost all educated Americans. It had given the second edition of *Buying and Owning Your Own Airplane* a new life after normal sales had declined after the first five years of publication. It also changed forever the way information was exchanged and made available, and General Aviation was no exception. If you want to buy a used airplane now, if you don't follow the websites carrying airplanes for sale on an almost daily basis it is likely that by the time print advertising appears the plane you want will be long gone, sold to an Internet-savvy buyer.

Other significant changes had occurred in General Aviation. A new liability law had been passed, not very good, but good enough to bring Cessna back into the market. New planes were once again being produced, although at outrageously expensive prices. Cirrus, Lancair, and Diamond brought truly new aircraft into the market. And there apparently are pilots out there fortunate enough to be able to afford airplanes with quarter-million dollar pricetags, even if for most of us it is just a dream. And GPS and other advanced avionics had brought previously unheard of capabilities to General Aviation aircraft at a price even the owners of 40-year old airplanes could afford.

The Internet also told the publisher that while the second edition of *Buying and Owning Your Own Airplane* was perceived as excellent by its target market, after more than ten years from its publication it was becoming dated. That word came from buyer feedback on sites such as Amazon.com and Barnes&Noble.com. The publisher was paying attention, and approached me to bring out a third edition. How could I say no?

Fourth edition

Big changes kept happening in General Aviation after the Third Edition was published. Glass cockpit airplanes were starting to be introduced as top-of-the-line options in 2004. But by five years later, almost all certified production airplanes were produced and sold with Garmin G1000 or Avidyne Entegra glass panel displays. Even used aircraft would be affected. By 2010, used airplanes now fell into at least three categories: late-model

production aircraft with glass panel displays, older airplanes with analog gauges, and older airplanes that had been modified with Aspen Evolution or Garmin G500 glass panel upgrades. And even for older airplanes that had analog gauges, a panel mounted Garmin 430 or 530, preferably with WAAS, was now a de facto minimum essential requirement for airplanes used for IFR flying.

A second change that so far hasn't lived up to its potentially huge impact is the introduction of Light Sport Aircraft (LSA). LSAs, built to industry-established ASTM standards rather than to FAA certification rules, were supposed to provide a new wave of inexpensive two-seat trainers and sport planes. There are now over 100 Light Sport Aircraft available on the market, but they still haven't achieved any significant penetration as a trainer on flight lines. There are many interesting new LSA designs, but most are priced at nearly \$150,000, costing more than twice what most aviation enthusiasts had hoped. Nevertheless, any book on buying and owning a personal aircraft would be incomplete without a chapter on LSAs.

Acknowledgments

It is truly hard to believe, in looking back on the effort involved in originally writing and publishing this book, how many people assisted me. My original aircraft partner and crew chief Steve Stetson was particularly helpful, providing a fresh outlook that focused my ideas, often at late hours in a cold hangar while we tried to fix some broken widget on our bird.

I owe much to those who made the original edition of the book possible, including J. A. Diblin, of AVCO-Lycoming (now retired), whose *AVCO Lycoming Flyer* was an authoritative source of aircraft engine knowledge; Warren Hupper, Fixed Base Operator at Tew-Mac Airport, who gave constructive criticism and other assistance; Bill Toomey, a working mechanic who gave me his honest view of aircraft owners; Link Noble of the Multibank Aviation Division of South Shore Bank, who supplied information on the policies of a bank specializing in aircraft financing; and a wonderful group of people at Analytical Systems Engineering Corporation who furnished much-needed material and moral support, including ASEC President James Henderson, Senior Technical Illustrator Mark Hayes, and then-secretaries Claire Peterson and Sheila MacLean.

More than ten years later, it was time to update and expand the book, and again I found almost everyone I asked for information, photographs, or support cooperative and encouraging. Among those who willingly gave useful and authoritative information were Terry Lee Rogers, hardworking founder of the Cherokee Pilots' Association, who allowed me to reprint

comprehensive information on sources of maintenance data originally published in *Cherokee Hints and Tips*; Ben Owen, of the Experimental Aircraft Association, who supplied extensive information on the EAA's autogas STC program as well as on rules and limitations that apply to home-built and kitbuilt aircraft; autogas expert Todd L. Petersen, of Petersen Aviation, Inc., who furnished his list of aircraft and engines STC'd for autogas; and William J. Barton, president of Monarch Air & Development, who provided information on his company's line of leak-resistant fuel caps and plastic fuel tanks to solve fuel system problems on Cessna single-engine aircraft.

Aircraft manufacturers and their representatives were very helpful in furnishing photographs of their aircraft. I would like to express my appreciation to Aerospatiale General Aviation; American General Aircraft Corporation; Beech Aircraft Corporation; the Wallace Aircraft Division of Cessna Aircraft Company; Classic Aircraft Corporation; Pick Point Air, Inc., New England dealer for Maule Air, Inc.; Mooney Aircraft Corporation; and Piper Aircraft Corporation.

The third edition was done in the age of the Internet. The Internet provides a wealth of information with, for better or for worse, little personal contact and therefore a lot less people to acknowledge and thank. I would like to thank Stu Mann and Jim Jackson of Lancair Northeast for an outstanding demonstration flight in the Lancair, Dave Mueller and Bill Vaccaro for an equally outstanding demonstration flight in the Cirrus SR22, Tim Tower of LMT Aviation for a great flying introduction to the Diamond DA-40-180, and Ken Dono of Columbia Aircraft Sales for the chance to fly the New Piper Archer III.

There are many people I have to thank for demo flights leading up to the Fourth Edition, with Light Sport Aircraft (LSA) being a new kind of aircraft to fly and evaluate. Those I have to thank include John Armstrong, Dominion Aircraft Sales, who educated me about Diamond Aircraft and gave me the chance to fly the latest DA40 XLT; Brendan Baldonado, instructor at Alpha One Flight School, who showed me that the SportCruiser LSA flies as beautifully as it looks; Mark Bennett, Northeast Marketing Manager for Cirrus for flights in the Generation 3 Cirrus SR20 and SR22; Robert Brew of Northeast Cubs who gave me a spectacular flight in the Cubcrafters Carbon Cub SS; Dave Fetherston, CEO of NexAir, who demonstrated an older Cessna 182 updated with an extensively upgraded glass panel installed by his company; Chris Ferguson, Remos USA demo pilot, who introduced me to the Remos G-3 high wing light sport; King Aviation Mansfield, which let me see both the high and low points of the light sport Cessna Skycatcher; Mitch Lock, Vans Aircraft East Coast Representative, who provided my first flight in a homebuilt and excellent light sport RV-

12; Tom Peghiny, President of Flight Design USA, who gave me a chance to fly the CTSW and the CTLS, aircraft that are leading LSA sales figures in the U.S.; Bob Sullivan, private pilot and aircraft owner, who gave me the chance to fly his Aerotrek A240 light sport; and Greg Trzaska, AeroAT-USA, who gave me the opportunity to fly the renamed Aero AT-4 low-wing light sport, formerly called the Gobosh G700.

I would also like to thank Aspen Avionics for the screenshot photos of their Evolution retrofit glass panel displays; my airplane operating partner Andy Goldstein for ForeFlight screenshot photos on an iPad Mini; and Remos Aircraft for the photo of their G-3 light sport aircraft, which appears prominently on the cover page of this e-Book.

1 Chapter One

Can I? Should I?

It takes a little while for the reality to sink in. This airplane you are flying is yours! Not a rental, not a club airplane, but yours! It just doesn't seem possible at first. You look at the older style instrument panel; at the older radios; at the faded, slightly scratched paint on the wings; and it still doesn't quite sink in. I own this airplane!

You begin to realize it when you see a beautiful valley just beyond the next ridge. Do you have time to fly over it? You check your watch...and then realize that you don't have to get this plane back until you feel like it! The awareness grows on a warm summer day when you taxi your plane to a tie down along a fence lined with wishful, adoring kids watching with a mixture of reverence and envy. And you remember the pride you felt that day when everyone else was on a tight schedule and you said casually, "Oh, that's OK, I'll fly my plane."

You realize it too when the radio dies, and you receive the \$1,500 repair bill. Or when you learn a \$5,000 lesson in the meaning of Airworthiness Directive. Every silver lining has its cloud. And that too is yours!

Ownership has become a way of life for you now. It is not exactly what you expected, but you know you wouldn't trade owning your old bird for a chance to fly a fleet of brand new Cessnas, Pipers, or even Cirruses. This is your airplane, and you wouldn't have it any other way!

The "Crazy Idea"

Thoughts of owning an airplane probably first occur to the average general aviation pilot during student pilot days. Just a crazy idea though. After all, a Porsche Carrera, or maybe a 36 foot cabin cruiser, or a jet set summer on the Riviera are fun to daydream about too—and probably in the same league financially as those shiny new airplanes the FBO flies and Flying magazine advertises. Oh well, who needs his or her own airplane anyway? The FBO's airplanes are clean and well maintained and always available for student lessons. Airplane ownership is just another interesting daydream.

You face a different world as a private pilot. Those airplanes you flew as a student never seem to be available when the weather is good. Or they are only available for one hour blocks, or at odd hours. Then there was that day you arrived at the airport only to find the airplane you had scheduled had been "borrowed" by an instructor for a lesson when the radio went out in "his" bird. "Nobody called you? We sure are sorry about that!"

There are airplanes available on a rental or club basis—Cessna Skyhawks and 182s; Piper Warriors, Archers, and Arrows; Diamond DA-20s and DA-40s; and maybe even an occasional Mooney, Bonanza, or Cirrus. A minimum of two hours flying required per day, of course—three hours on Saturdays, Sundays, and holidays. Over three hundred dollars a day! Are you buying the damn thing or just flying it?

By now you have read the bulletin boards at small airports, leafed through a copy or two of *Trade-A-Plane*, and even checked some websites advertising airplanes for sale. That crazy idea comes back again. Could I really own my very own plane? The idea grows slowly, but it does grow. The impossible dream seems less out of reach, less improbable, and finally, maybe, just maybe, possible!

Can I Afford It?

The most crucial question facing the prospective buyer is, Can I afford it? Surprisingly enough, the average, active private pilot can afford to own an airplane. The emphasis is on “active.” If you fly rental aircraft 50 to 75 hours per year at a typical cost of \$100 to \$175 per hour, you are spending between \$5,000 and over \$13,000 per year. You must be able to afford it because you are spending that much!

The cost of an airplane can be divided into two categories: the cost of acquisition and the cost of ownership and operation. The cost of acquiring a good used airplane varies with the sizes and capabilities of the choices. A good 15- to 40-year old, four-seat VFR aircraft of modern construction, such as the Piper Warrior or the Cessna Skyhawk, will cost approximately twice as much as a basic 10-, 20-, 30-, 40-year old or older two seat trainer, such as a Cessna 150 or 152, a Piper Tomahawk, or an Ercoupe. A good 20- to 30-year old, four seat minimum IFR airplane, the Piper Warrior and the Cessna Skyhawk being prime examples, will cost about three times as much as the basic VFR two seater. *Trade-A-Plane* can be used as a handy guide to estimate what any particular type or category will cost.

Yearly expenses can best be demonstrated by presenting a sample calculation of the cost of owning and operating a typical aircraft. For this purpose an airplane capable of carrying two adults, two children, and a small amount of baggage (such as a Piper Warrior or a Cessna Skyhawk) and costing \$50,000 will be assumed. A typical aircraft would have 1,000 hours left before major overhaul on a 2,000 hour time between overhaul (TBO) Lycoming O-320 engine, would burn 9 gallons per hour in cruising flight, would be equipped with a Garmin 430 GPS with comm and one 720/200 channel full capability backup nav/comm and would be capable of

limited IFR flying. It is assumed that the aircraft is to be purchased with a \$10,000 down payment and five year repayment of a loan for the remaining \$40,000. For purposes of simplification, an interest rate of 10 percent is assumed to be paid in equal sums over each of the five years, with no allowance being made for factors such as interest charges going down as the loan is paid off.

The cost of owning and operating an airplane is further broken down into two categories. The first (indirect expense) is independent of the number of hours flown. The second (direct expense) is the actual cost of operation. There would be no direct expenses if the plane were never flown.



Figure 1-1. If you are an active pilot, aircraft ownership is the “possible dream.”

Indirect Expenses

The indirect expenses that might be encountered in a typical year fall into two groups. The first includes expenses that would be typical after the aircraft loan was paid off, such as insurance, tie down, annual inspection, unscheduled maintenance, taxes, and fees. The second includes costs directly attributable to those associated with the loan, such as interest, repayment of principal, and additional insurance.

Insurance costs are estimated at \$1,000. This assumes liability coverage of \$1 million and hull coverage for ground incidents or accidents only (including those in motion). This means that the owner could not recover any losses suffered between the start of the takeoff roll and the completion of the landing roll. The cost of in flight hull coverage is substantial, however, and many owners choose to fly without it. (More detailed information on aircraft insurance is presented in Chapter 6.)

Tie down costs may be \$1,200, or \$100 per month. This is typical of a tie down on a paved surface at a medium-size, tower-controlled field. Grass tie downs at smaller fields may run as low as \$50 per month. In most cases, hangar fees will be too high for the average individual owner, running from \$175 per month for an unheated hangar with a dirt floor at a small field to over \$500 per month for a heated, lighted hangar at medium-size, tower-controlled fields.

An annual inspection, required yearly by the FAA for all active registered aircraft, generally costs approximately \$7.50 per horsepower for the basic inspection—for our example, \$1,125. The repair of any problems found during inspection will be at the shop rate, and costs are in addition to the charge for basic inspection. While annuals can be obtained more cheaply at less reputable shops, this is not the time or the place to look for cut rate deals. Shoddy maintenance practices will cost you more in the long run at best, and at worst they could kill you. This is probably a good time to have any marginal items taken care of as well, since the aircraft will already be in the shop and opened up for inspection. Repairs and marginal items may cost about \$1,000, for a total annual inspection cost of \$2,125.

Oil changes, which are scheduled by engine tach time rather than by the calendar, and unscheduled maintenance are assumed to cost \$2,000. Unscheduled maintenance consists of those nasty surprises associated with aircraft operation, like sticking or broken carburetor or cabin heat control cables, burned out rotating beacon bulbs, rapidly deteriorating nosewheel shimmy dampeners, or any number of other things capable of wiping away your smile. Twenty hours of labor at \$75 per hour and \$500 for parts and supplies combine to make up the \$2,000 figure. This would probably be adequate for a typical year. However, the first year of ownership of a used airplane is generally a time for correcting numerous inherited problems, large and small. It is also a time of making minor modifications to make it “yours.” A wise buyer of a used aircraft probably should set aside 10 percent of the purchase price for correction of real and imagined first year problems.

State and local registration fees and taxes will probably cost at least \$250 per year.

Total yearly indirect operating expenses, not including loan repayment and associated charges, come to \$6,575. Repayment of the \$40,000 loan and interest, plus \$500 to cover the cost of additional in flight hull insurance (which a lending institution would insist on), adds \$12,500 per year. Total yearly indirect expenses, to be paid before the prop ever turns, come to \$19,075. These costs are summarized below:

Insurance (ground hazards only)	\$1,000
Tie down (\$100/month)	\$1,200
Annual inspection	\$2,125
Unscheduled maintenance	\$2,000
Taxes, fees	\$250
<i>Subtotal</i>	\$6,575
Interest on loan (10%)	\$4,000
Repayment on principal	\$8,000
Additional insurance (hull)	\$500
<i>Subtotal</i>	\$12,500
Total	\$19,075

Direct Expenses

Direct expenses for the sample airplane are the sum of gasoline costs and a set aside fund for a future major overhaul. At \$6.00 per gallon of gasoline, burned at a rate of 9 gallons per hour, hourly gasoline costs are approximately \$54.00. A wise owner will establish a reserve fund based upon the number of hours flown, the cost of a major overhaul, and the amount of time remaining on the engine. The sample airplane has 1,000 hours remaining on the engine. Typical major overhaul costs for the Lycoming O-320 are assumed to be \$24,000. Therefore, the owner must set aside \$24 per flying hour to have the money available when the “major” is due. (If the airplane is sold before it is due for the major overhaul, no set aside would be required. Nothing is free, of course. An aircraft sold with a high time engine will simply not sell for as high a price as a similar one with lower engine time.) Finally, to compute the total direct cost, add the cost of gasoline to the set aside for major overhaul, which results in total direct costs of \$78.00 per hour.

To compare the cost of owning an airplane to that of renting, it is necessary to know the total price per hour. To compute this figure, the yearly indirect cost is divided by the number of hours the plane is flown per year, and this figure is added to the direct cost per hour. Table 1.1

shows the hourly expenses of operating the sample airplane for 50, 100, 150, 200, 250, and 300 hours per year. Operating costs are shown independent of those resulting from repayment of the loan. For 100 hours per year of utilization, indirect operating expenses (\$6,575) are divided by 100 and then added to the direct expenses (\$78.00) to arrive at a cost per hour of \$143.75. Loan expenses (\$12,500) are likewise divided by 100 and added to the \$143.75 to bring the total cost per hour to \$268.75.

It is apparent from Table 1.1 that the cost per hour of operating the airplane goes down as utilization goes up. While the direct operating expenses will remain constant regardless of the number of hours flown, the impact of the indirect operating expenses on the cost per hour will decrease as the number of hours increases. If it is assumed that the cost of renting an airplane of similar capabilities is \$150 per hour, it is apparent that the break even point for renting versus owning, independent of loan expenses, falls between 75 and 100 hours flown annually. If loan expenses are taken into account, the airplane would have to be flown just over 250 hours to approach break even.

Hours	Operating Expenses			Loan Expenses, Indirect	Overall Total
	Indirect	Direct	Total		
50	\$131.50	\$78.00	\$209.50	\$250.00	\$459.50
100	\$65.75	\$78.00	\$143.75	\$125.00	\$268.75
150	\$43.83	\$78.00	\$121.83	\$83.33	\$205.17
200	\$32.88	\$78.00	\$110.88	\$62.50	\$173.38
250	\$26.30	\$78.00	\$104.30	\$50.00	\$154.30
300	\$21.92	\$78.00	\$99.92	\$41.67	\$141.58

Prospective buyers should not assume they will necessarily fly significantly more hours a year as owners than they would as renters. Readier access to the airplane will often be offset by an increase in the boredom with local flying. The real impact will be in the area of freedom. Freedom to go to a variety of places “just for the hell of it”—to fly to a lake or beach, forest or mountains, or to visit family or friends just to spend a day. This intangible will often be the deciding factor. Using your airplane to fly to a location one hour or two hours flying time away will not significantly add to the number of hours flown. But it may just become a way of life, widening immensely the circle of places to go and things to see that will be available to you on any weekend.

Alternatives to Owning

The only real way to significantly lower the indirect costs of owning an airplane, as well as the initial cost of acquisition, is to buy and operate it in partnership with one or more other pilots. This route may open many doors to ownership that would otherwise remain financially closed to many prospective buyers. Partnerships, however, should be approached with caution. Marriage is probably the only partnership requiring more tact and diplomacy in its consummation than a partnership of aircraft owners. Leaseback arrangements and club memberships are other alternatives to renting. However, these should not be viewed as ownership. They are, in effect, business arrangements having their own advantages and drawbacks. Fractional ownership arrangements are an innovation of the new millenium, offering high-cost partial share ownership of new aircraft. All of these options will be discussed in Chapter 2.

So, we return to the crucial question. Can I afford it? Can I afford it alone? If not, can I afford it with one or more partners?

Which Airplane?

If you have decided you can afford to own an airplane, you are ready for the second crucial question. Which one are you going to buy? This should translate not only into, What do you want? but also into, What really suits your needs? There is probably no single factor more responsible for turning first-time owner-pilots into bitter ex-owner-pilots than buying an unrealistic first airplane. Forget the big old Navion you saw. Forget the 400 Comanche. Forget the out-of-production twin with the high-time engines that seemed like a real bargain. Forget all those big, complicated airplanes! Exotic birds may be a bargain when you buy them, but finding parts and a knowledgeable mechanic may be like a Crusader's search for the Holy Grail.

For your first airplane, think small and think common. Airplanes more than six or seven years old, if properly maintained, seldom depreciate. If your first airplane turns out to be too small or too slow, you can always move up. And when you do, you will move up with the knowledge of the ins and outs of aircraft ownership that has been acquired by hard experience but at a relatively low price commensurate with the small size of your plane. Start big or exotic, and you will see big and exotic maintenance bills and end up convinced that airplane ownership must be only for the Buffetts, the Gates, and the Gettys.

What kind of speed and range do you want? If your typical trip is 150 miles, the difference in en route time between an aircraft like the Piper Warrior or the Cessna Skyhawk compared with bigger, faster, and more

complicated aircraft like the Piper Arrow, the Cessna 182, or the Cirrus SR20 is less than 15 minutes. Is that worth paying an initial price that is \$25,000 or more higher, or \$30 more an hour for aviation gas (avgas), or \$25,000 more for a major overhaul? If you fly mostly VFR, do you really need an airplane with a 1,000-mile range just to do away with one 15-minute fuel stop? The airplane may outlast your bladder!

How many seats do you need? Check your logbook again and see how many times you flew with only one other person. It is probably much more often than the number of times you took your whole family. More than two small children? Better settle on a two seater. You won't be able to afford a six seater and who would you leave behind? On the whole, it is a relatively simple matter to find an economical, reliable airplane that will carry two couples or a family of four with a minimal amount of baggage. This is the key to the success of the Skyhawk and the Warrior, and the Cherokee 140 can fill the bill better than most pilots realize. But for more than four seats the price goes out of sight for many of us.



Figure 1-2. The Piper Cherokee 140 is an excellent first aircraft.

Do you intend to use the airplane for business flying? Better check with your boss. Many employers, for good reasons or no reasons, prohibit the use of personal aircraft for company business, or they impose odd and limiting restrictions.

Will you use the airplane for training? Better check with an aircraft insurance agent. Your plans to teach in your own airplane may not look so bright when you find out your insurance premium doubles if you want your student's first solo to be covered, or you may not be able to get coverage at all.

Going to rent your plane to friends? Back to the insurance agent. Your prospective insurance company may define your airplane as a commercial operation and up your rates by 100 percent the moment you accept

the first penny or even the first gallon of avgas. And how about hull coverage? How would you like to sue your buddy when he or she makes a dumb mistake and totals your bird? You only carried ground hazard coverage, remember? The insurance company certainly will!

Are you going to fly IFR? Older radios may be obsolete, not meeting FCC frequency tolerance standards, having too few frequencies, and no maintenance or spare parts available. On the other hand, new radios cost a bundle. Installation costs can be outrageous. And don't expect to get a bargain. Even if you find cut-rate prices on new radios, the avionics manufacturer may have the funny idea that you have no warranty unless the installation was done at an "approved" shop. You should probably try to find an aircraft with a Garmin 430 already in the panel, preferably with WAAS, if you plan to fly it IFR.

Do you really need Garmin G1000 or Avidyne glass, or are good old steam gauges good enough? Do you really want glass so badly that you are willing to pay double, triple, or quadruple the price of an analog gauge airplane that otherwise has identical performance? Even if you learned in an airplane with glass, getting a good checkout in a steam gauge equipped airplane will qualify you to safely fly something you are much more likely to be able to afford as your first airplane.

So after you have weighed all these factors, you will have defined what you want. It may even approximate what you need, and more importantly, what you can afford to own!

Now let's look at some interesting but less important questions. Should you buy a high wing or low wing aircraft? How about a taildragger? What about older airplanes—ones that are no longer in production, like Ercoupes or Piper Colts? If simple aircraft are better, what about the simplest of all, the ultralights? And what about home built, the new cutting edge of general aviation technology?

The merits of high-wingers versus low-wingers have probably been debated around airports since the first designer tried one wing instead of two. There are really no compelling reasons for favoring one over the other.

High-wing aircraft obviously offer a better view of the ground while flying over it. However, for budding amateur photoreconnaissance types, the strut supporting the high wing often cancels out any inherent advantage this type may have. The strut seems to have a habit of sneaking into whatever corner of the photo your camera's viewfinder leaves out. High-wing aircraft generally have two doors, allowing for easier ground access. The high wing also makes a great umbrella if a cloudburst should hit before you get that last door closed. And if the engine's fuel pump should fail, gravity can take over if you are not in the midst of some insane (and prob-

ably prohibited) maneuver.

The crucial advantage of low-wing aircraft lies in its increased visibility into those places above, from which the threat of a collision is most likely. The pilots of low wingers don't have to do a frantic dance on the taxiway to assure that they are not taking the runway away from someone cutting short their base-to-final turn. And in the landing pattern, the wing toward the runway drops on a downwind-to-base turn. Very helpful if some idiot is hedgehopping his or her way to a long, low, straight in landing. As for what that other wing is blocking out...who cares? You are already turning away from that direction! A ready-made evasion maneuver. A low-winger is also conducive to properly checking fuel tank caps and is a godsend to the service crew. But perhaps the low-winger's greatest advantage is in the daydream mode. After all, did the Flying Tigers sit on the wing or hang under it? Remember, even illustrious fighter aces got wet climbing out of their planes in a rainstorm!

With the exception of J-3 Cubs and Cessna 170s which have now become expensive classics, and new production Huskys, Maules, or Legend or CubCrafters Cub clones, taildraggers can be some of the lowest priced aircraft available. According to the pilots who own and fly them, they also can be some of the most fun aircraft to own. Taildragger pilots will be quick to assure any listener in sight that only they fly their planes. People with the extra wheel up front drive theirs! Anyone trained in tri-cycle gear airplanes (and who isn't these days?) should be very careful when transitioning to taildraggers. Taildraggers have an inherent tendency to weathervane, pointing their noses in whatever direction the wind is coming from. Makes life interesting if there is a crosswind or variable and gusty winds! The results for a pilot who does not concentrate at all times during the landing and takeoff roll, or even while taxiing, can be and have been enough to make a grown man or woman cry. Taildraggers surpass their more modern nose-legged relatives on short grass strips, rough gravel strips, or skis. They are a natural for the free spirited, so if you long for the good old days away from towers, terminal control areas (formerly TCAs, now Cat B airspace), and two-mile runways, a taildragger may be ideal.

Most taildraggers on the used market will be older aircraft, which as a group present their own unique rewards, challenges, and problems. Older aircraft (which for purposes of this book are those built before 1960) can be some of the real bargains on the market in terms of acquisition price. Unlike automobiles, which generally are considered to have outlived their usefulness when 10 years old, well-maintained aircraft can have an almost indefinite lifetime. An older airplane can be an object of pride to an owner willing to invest the time and money required to keep it in top-notch condition.



Figure 1-3. Taildraggers are fun to fly but should be approached with caution by pilots trained in tricycle gear aircraft.

The long-term costs of maintaining an older airplane at many large metropolitan fields may far exceed the cost of maintaining a 10-, 20-, or even 50-year old version still in production. A variety of factors are involved. Older aircraft may have been built with different construction methods, such as wood or steel tube and fabric, not used in most modern production types. It may be difficult to find mechanics who are capable of making high-quality repairs to wood or fabric-covered planes. Even if contemporary construction techniques are used, mechanics may be unfamiliar with the model. You will end up paying for the time a mechanic takes to learn the subtle differences in your airplane. However, maintenance of specific older types may be much less expensive at smaller fields where the mechanics may have the specialized knowledge and skills required. One fairly reliable indicator is the number of similar aircraft at the field. If Cubs, Champions, Huskys, and other ragwings abound, your odds are pretty good that there is a mechanic around who “knows fabric.”

Parts availability for older aircraft may be another problem. A classic case is the Franklin engine used in beautiful old Stinsons as well as in other old planes. The complete and total rights to the Franklin engine line were sold to a Polish firm, and now the local U.S. distributor is up for sale. Do

you really want to rely on any new parts coming all the way from Poland, even if the parts are available from U.S. distributors? Parts availability for older aircraft is generally not hopeless, however. Specialized parts suppliers like Univair in Colorado, Wag-Aero in Wisconsin, and a variety of other companies advertising in *Trade-A-Plane* carry an extensive line of parts for many out of production aircraft.

Older aircraft may present other problems. If you want IFR capability, you should be aware that panels in older planes were not designed for the extensive complement of radio equipment found in even the average modern IFR trainer. Significant modification or replacement of an instrument panel can be a very costly undertaking. Insurance costs also may be higher for older aircraft, due to increased parts and repair costs. Taildraggers may have even higher insurance rates, reflecting a history of minor and major landing accidents. Insurance companies may require minimum checkout times with an instructor familiar with the aircraft. If the previous owner is not an instructor, you could have difficulty complying with this requirement.

Another problem with older aircraft is that most have engines designed for 80/87 octane avgas. Continuous use of 100-octane, low-lead gasoline (100LL) in these engines will generally result in lead-fouled spark plugs and lead buildup around the valves. Older Continental engines, including the O-200 used in Cessna 150s and the O-300 used in Cessna 170s and 1967-and-older 172s, are particularly susceptible to 100LL problems. It is not unusual for one of these engines run regularly on 100LL to require replacement of valves in at least one cylinder every 250 hours. New-design valves and seats have helped but not eliminated this problem. Lycoming engines, generally found in older Piper aircraft, are less susceptible to 100LL problems but still generally require at least one top overhaul between major overhauls if 100LL avgas is used regularly in them.

Supplemental type certificates (STCs) are available from the EAA and through Petersen Aviation in Minden, Nebraska, to allow almost any aircraft certificated to operate on 80/87 avgas to use autogas. Unfortunately, with Congress beholden to the corn and ethanol lobby, few if any places in the U.S. have autogas not contaminated with at least 10% ethanol. And ethanol is not compatible with most aircraft fuel systems and seals. Another answer is to use a fuel additive marketed by Alcor, TCP, which acts as a lead scavenger to prevent the buildup of lead on valves, valve seats, and spark plugs.

If simple airplanes are best, are ultralights an answer to the prospective aircraft owner's dreams? Unfortunately, no. Ultralights seem to fall into two categories, neither one particularly desirable to a pilot wanting to

safely experience and share the joys of owning and flying his or her own airplane.

Many original ultralights were unregulated and dangerous aircraft with all too flimsy “aluminum lawn chair” construction. Parts were used that weren’t aircraft quality, and all too often key structural parts or fittings subject to corrosion and wear were buried beneath fabric, making good preflight inspection impossible. The inevitable result was reflected in a National Transportation Safety Board report issued in late 1984 showing that between March 1983 and September 1984, 88 out of 177 ultralight accidents studied were fatal, with an airframe failure rate six times that of certificated single engine aircraft.

Many ultralights have become stronger and better since then, but 14 CFR Part 103 makes the best of them severely and artificially constrained miniature versions of “real airplanes.” An ultralight is limited to a maximum empty weight of 254 pounds; it must be a one person machine, have a maximum speed of 55 knots, and a maximum fuel capacity of 5 U.S. gallons. If you live in a large metropolitan area, you’ll have quite a drive to get to where you can legally fly it, because you can’t fly one over those congested areas depicted by all those yellow patches on the Sectionals. You’ll be flying an aircraft with light wing loading, so you should not plan on flying in winds much over 10 mph (and if you do, you won’t go very far against the wind anyway!). You’ll also have a two-cycle engine requiring an overhaul after about only 200 hours of operation (but considering the limitations of the vehicle, that may be several years).

In 1988, a *Private Pilot* magazine survey of ultralights showed a cost of ultralight kits starting at about \$5,000 and going up from there. If you want it put together, ready to fly, figure to pay at least \$10,000. In 2003, good used ultralight aircraft were still selling for not much more than \$10,000, a bargain considering how the prices of other aircraft had increased over the years.

If the thought crosses your mind that maybe a used one will do, remember that this is not a certificated aircraft. It will come with a totally unknown maintenance history unlike certificated aircraft, where an aircraft mechanic has to at least put his or her reputation on the line as to its airworthiness once a year. Cheap to fly and maintain? Not necessarily. The dacron or nylon wings are susceptible to ultraviolet deterioration, requiring hangaring, or wing covers and an outdoor tie down. Some ultralights can be readily disassembled for ground transportation and storage, but most cannot, despite manufacturers’ claims. The best source of reliable information on ultralights is likely to be an ultralight club specializing in the operation and maintenance of this kind of aircraft.

An Aeronca Champ or a J-3 Cub will do almost everything most ultralights will do. But the difference is that when you're tired of slowly circling near your home field, you can push in the throttle and go somewhere. And you can even take somebody with you! Curiously enough, both the Aeronca Champ and the J-3 Cub will meet the new light sport rules. The sport pilot/light sport rules have created an entire new series of light two-seat aircraft, but the resulting new aircraft tend to cost well over \$100,000, too much for most recreational pilots and even FBOs looking for good inexpensive trainer aircraft. It has made most ultralights obsolete, as many ultralight pilots were older pilots who had experienced medical problems, "lost their medicals," and didn't want to put up with the hassles of regaining the FAA's blessing to fly again. The sport pilot rating should open the door to pilots in danger of losing their medicals, and others, to be able to buy and fly two-seat light sport aircraft without worrying about the every-other-year crises at the Medical Examiner's office.

Are home built an answer to aircraft ownership? If all you can afford is a used aircraft, probably not. The home built and kit built aircraft movement today is on the forefront of general aviation progress, but one price of progress is that poor designs are just as prevalent in the marketplace as good ones. When dealing with home built, one should keep in mind that these are uncertificated aircraft. Their stall speeds can be more than the 61 knot maximum imposed by 14 CFR Part 23 on certificated aircraft; they may or may not have had extensive structural and in flight testing; and they may well have very strange handling characteristics. Homebuilt aircraft built for high speed cruise, for example, may have very high stall speeds and require long runways for safe operation. Homebuilt aircraft have no 61-knot maximum stall speed limitation, which could make them deadly for someone attempting to fly an approach in them at typical certificated aircraft speeds.

The price of the aircraft will be inexpensive only compared to a new certificated aircraft. It is not unusual for the price of an excellent kit built aircraft like a Vans RV-series airplane or a Lancair with a 160- to 200-hp engine and full avionics instrumentation to exceed \$50,000 or even \$100,000 without even considering the value of the builder's time. Four seat RV-10s with full glass cockpit IFR instrumentation can easily push a quarter of a million dollars or more, getting close to the new price of Cirrus SR-20s. The finished aircraft will never be able to be flown for compensation or hire, and if you want to sell it, you will find an uncertain market and be faced with the threat of a liability suit if the purchaser ever has a crash. After all, you are the builder.

Obviously, there must be some advantages to homebuilts or there wouldn't be so many of them. The November 2003 edition of the Experimental Aircraft Association's homebuilder website states that the number of homebuilts registered in the United States now exceeds 32,000, more than 15 percent of the single-engine piston-powered fleet. Home built aircraft can be ideal for the person who has the skills required to work with the particular materials the aircraft is to be made of, be it wood, aluminum, fiberglass, or more exotic composite materials. For the person who builds his or her own aircraft, the result can be an aircraft exceeding the capabilities of any "off the shelf" aircraft. The aircraft builder will know the intimate details of the aircraft and will have the latitude to do far more of his or her own maintenance than the certificated aircraft owner could ever think of. Certification as a "repairman" in accordance with FAA Advisory Circular 65-23 can even enable the primary aircraft builder to do major airframe and engine maintenance normally done by certificated mechanics, provided the work is done only on his or her aircraft. This includes doing annual "condition inspections" in accordance with 14 CFR Part 43, Appendix D inspection guidelines.

How about buying an already built homebuilt or kit built? Unless you know the builder and have watched the aircraft being built, you will have little or no guarantee of the quality of the workmanship that went into the aircraft. Since the FAA now only requires one FAA inspection before the first flight of the aircraft, you cannot be sure that a used home built aircraft is even structurally sound or safe. A very close inspection of the construction logs, however, can provide reassurance that the aircraft was well constructed and that EAA inspectors have conducted recommended supplemental inspections prior to the FAA inspection. AC-20-27C, "Certification and Operation of Amateur Built Aircraft," recommends standards for detailed construction logs and precover inspections by Experimental Aircraft Association (EAA) inspectors during the building of home built and kit built aircraft. If you are considering buying these types of aircraft, you should become familiar with this advisory circular as well as with AC-65-23. And you should definitely join the EAA and become familiar with the extensive material they have available on building and owning homebuilts.

A buyer of a home built or kit built aircraft can work on the aircraft during the course of the year just as if he or she were the builder, according to EAA sources. This can be a significant advantage for an aircraft owner who is mechanically adept but doesn't have the time to build his or her own aircraft. However, an annual inspection or an annual "condition inspection" will be required, and the new owner will not be able to be certificated

as the repairman for purposes of this inspection because he or she will not be the primary builder of the aircraft. If the aircraft has been maintained by its builder, the builder who holds a certificate and who is selling you the aircraft can continue to do the annual “condition inspections.” If you plan to base the aircraft near the original owner or builder, it may be a good idea to see if you can make this a condition of the purchase. Otherwise, you are likely to have to engage the services of a certificated aircraft mechanic to work on the aircraft who knows little or nothing of the unique construction details of an aircraft for which no airframe maintenance manuals are likely to exist. Because of the limitations on the repairman’s certificate, if you are capable of working on the aircraft yourself and have lots of spare time, you may be better off building your own rather than buying one built by someone else.

Unfortunately, a National Transportation Safety Board (NTSB) study released in 2011 showed that from 2001 to 2011, the accident rate for Experimental-Amateur Built (E-AB, or homebuilt) aircraft was more than twice as high as comparable General Aviation aircraft in similar flight operations. The fatal accident rate during the same period was more than three times as high as other GA aircraft. Of particular concern was that a high percentage of the crashes were during the first flight by the builder, or during the first flight by a new owner. Actually, those purchasing the aircraft rather than building it had a worse safety record. The report said that there “were a greater number of accidents occurring during the first flight by the new owner of a used E-AB aircraft compared with the first flight of a newly built aircraft.” The message here is that if you are interested in buying an already built homebuilt, be sure to get a thorough checkout in the aircraft by an instructor familiar with that aircraft before taking it home, especially if it is one with unusual flying characteristics.

One option for anyone who is handy enough to build their own aircraft but who can’t afford the price of the kits and the engines and instrumentation is to consider rebuilding an old fabric covered aircraft like a Champ or a Taylorcraft. The EAA also has many members who are into rebuilding old aircraft rather than building new ones, and can provide a wealth of information to a person wishing to try this route to ownership. Keep in mind, of course, that your work will have to be monitored and signed off by a cooperative mechanic. Rebuilding a certificated aircraft does not eliminate FAA requirements, however, which apply to the maintenance of all certificated aircraft.

Ownership is Possible

Ownership is not beyond the reach of the average, active general aviation pilot who is willing to sacrifice other luxuries for the pleasure of owning an airplane and is content to settle for a simple, unsophisticated type. The cost is high enough that if a prospective owner and his or her family can only afford one expensive hobby, they must be willing to make the plane the one. A spouse's likes or dislikes also should be considered in the decision to buy an airplane and which one to buy. And a buyer should remember that acquisition costs and the fixed expenses of ownership can be made more acceptable by sharing the aircraft with one or more partners. A bleak financial picture can become much brighter when costs are divided by two or three.

A readily affordable aircraft should be simple to operate, easily maintained, and readily insurable. It should be over 10 or more years old, so that the owner will not be faced with depreciation losses. Good modern design airplanes available with a low purchase price are two seat trainer aircraft, including the Cessna 150 and 152, the Piper Tomahawk, and the Diamond DA-20. Older Piper Cherokees and Warriors and Cessna 172s are good affordable four seaters. Even older two seat aircraft can be good buys if the owner understands and is willing to accept the problems and limitations of such aircraft. Good examples in this category are the Aeronca Champ, Taylorcraft, Luscombe, Piper Colt, and Ercoupe.

Maximum simplicity and the assurance of readily available parts and knowledgeable mechanics are more likely to be obtained when buying an older version of an aircraft currently in production or for which parts are still being produced by the original manufacturer. By buying an older version of a fixed tricycle gear, fixed pitch prop, two to four seat aircraft similar to one the pilot is currently renting, the purchaser will also have the advantage of knowing the aircraft (and the added advantage of lower insurance rates). The trap of "buying what you trained in" should be avoided like the plague, however. Familiarity with a single line of aircraft can blind a prospective owner to other excellent models of both old and new design.

Even if you are one of those fortunate individuals who has made more money than the average person ever dreams of without winning the lottery, don't be too ambitious with your first aircraft. A simple but capable aircraft like the fixed gear Piper 161 or 181, a 180-hp Skyhawk SP, a Grumman American Tiger, or the Aerospatiale Tobago will be a good first time aircraft. Learn about the complexities of owning an aircraft with a "bullet proof" design first, before moving up to faster and more exotic varieties like Bonanzas, Cirruses, Lancairs, Mooneys, and Lakes.

To avoid many possible pitfalls, a buyer must be knowledgeable in a wide range of areas associated with aircraft operation and maintenance—how to select a good airplane; how to select the right home field; paperwork from and for a variety of government agencies and a confusing tangle of requirements cropping up every six months, every year, every two years, every five years; insurance coverage; top overhauls; major overhauls; and modifications. The following chapters, while not all encompassing, are intended to provide the average owner or prospective buyer with at least the minimum knowledge required to make the experience of buying and owning an airplane a satisfying one rather than a costly nightmare.