

REPEAT PERFORMANCES

*Insights into the fine art of
buying the used airplane.*

BY SETH B. GOLBEY

TIMES have been tough for aircraft manufacturers. The eight-year-long decline in new aircraft deliveries is old news. The reasons for this recession are still not fully understood, but the outcome is self-evident. The uncertain future of the industry as we have come to know it has been the subject of endless speculation in the pages of the aviation and business press. Manufacturing is only one side of the market, however. Another is trade in used aircraft.

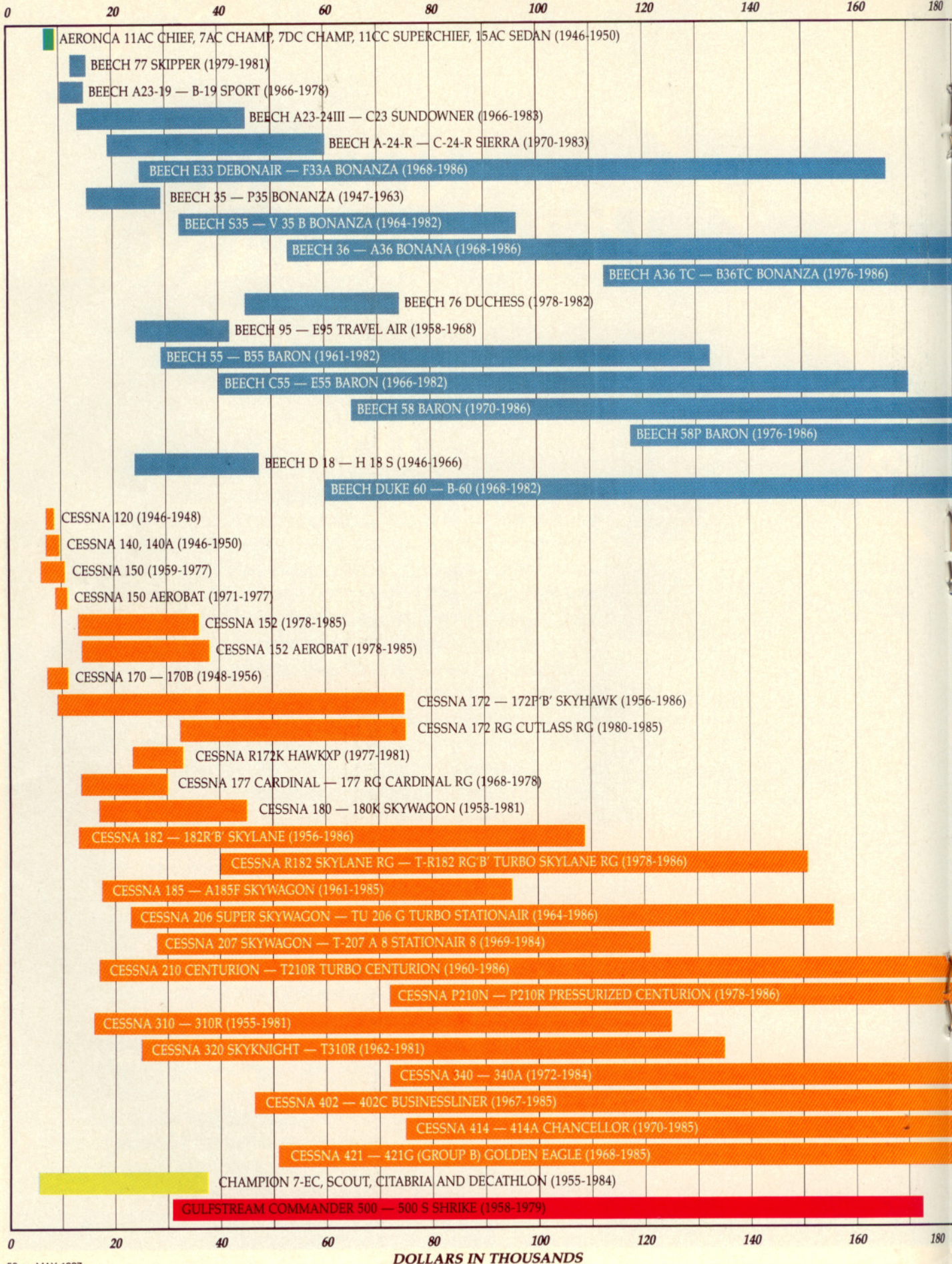
As long as demand exists for reasonably priced aircraft, whether for pleasure or business use, the market for "formerly owned" airplanes will be strong, as it has been for years. We can attempt to track this market by examining Federal Aviation Administration records of registration applications, but these figures do not tell the whole story because many of these transfers of ownership are intradealer transactions. A look at the Aircraft Bluebook—Price Digest values of used aircraft, though, demonstrates that the rate of depreciation of many models has slowed, and in some cases reversed. Many older aircraft cost significantly more to buy today than they cost when new. This is a sign of strong demand.

In the charts on the following pages, you will see that an enormous range of used aircraft is available over an equally large price spectrum. There is almost literally "something for everyone" in today's used airplane marketplace.

Aircraft are not like automobiles, however. The purchase of an airplane more closely approximates the magnitude of a real estate investment, not only in terms of the bottom line (relatively new single-engine four-seaters can easily cost more than the houses many of us live in), but also with regard to the level of consumer knowledge that is required. Nobody is born with this knowledge; it is only gained by dint of exhaustive research and sometimes tearful failure.

continued on page 64

DOLLARS IN THOUSANDS



DOLLARS IN THOUSANDS

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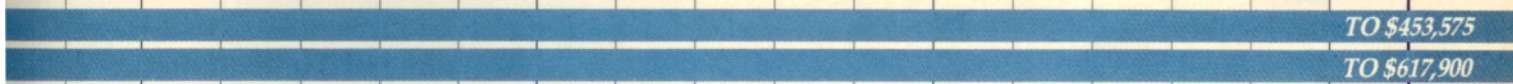
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RECIPRO-CITY

The color bars reflect the average retail price range for some of the most popular general aviation aircraft. These prices approximate the fair market value for aircraft assumed to be (a) in average condition (b) with mid-time engines and (c) equipped with the quality and quantity of equipment generally expected for a model of given age and mission capability. Years of production are listed for each model. For aircraft still being manufactured in 1986, the high end of the bar represents the list price of a new 1986 model with average equipment. All information provided here was derived from the spring 1987 edition of the *Aircraft Bluebook—Price Digest* and was used by permission of its editors.



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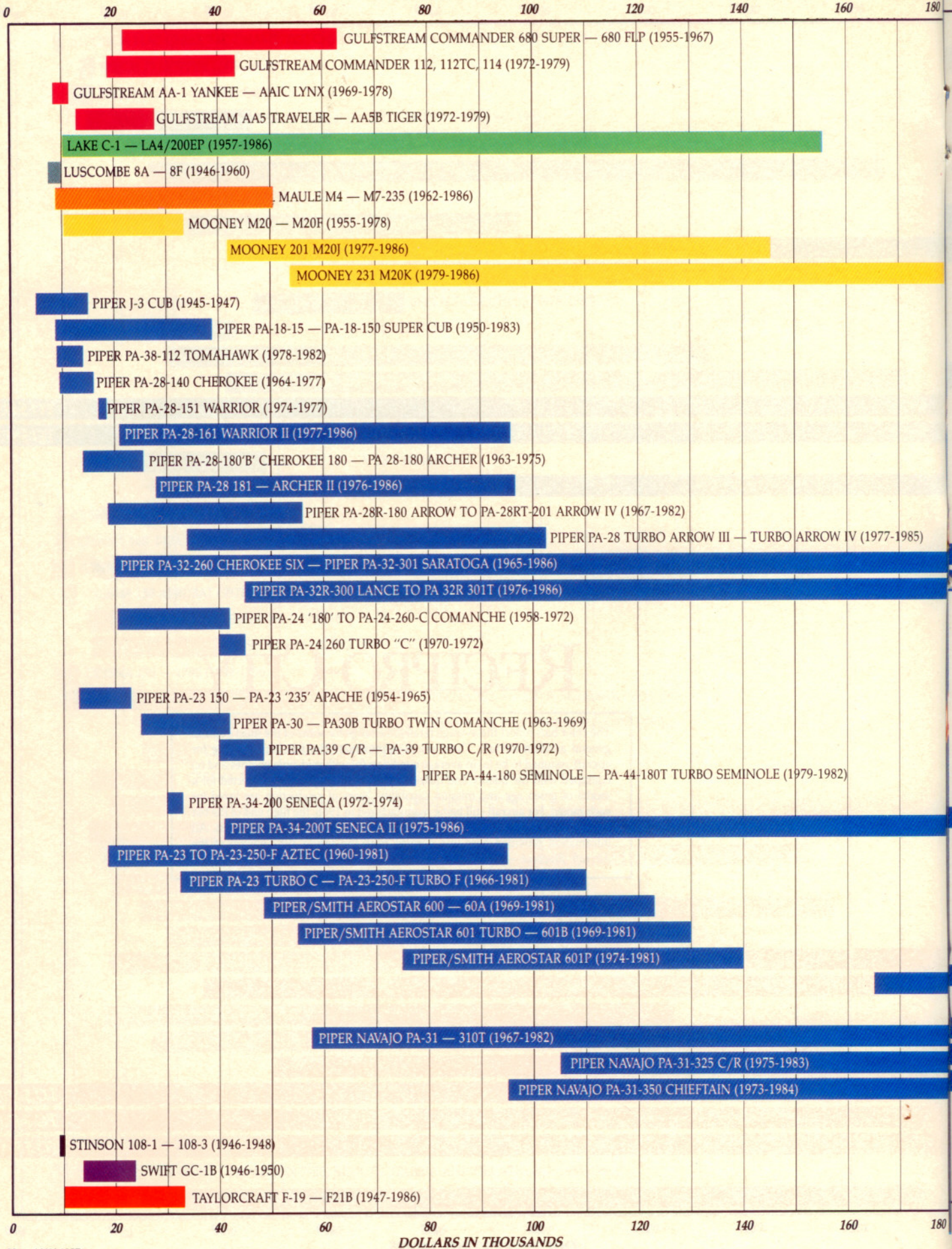
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PIPER PA-46 MALIBU (1984-1986) TO \$404,430

PIPER AEROSTAR 602P (1981-1983)

PIPER AEROSTAR PA-60-700P (1984)

PIPER PA-31-P MOJAVE (1984)

0

1

2

3

TURBOJETS

BRITISH AEROSPACE DH 125-1A — Bae 800 (1965-1986)

CESSNA CITATION 500/501 SP (1972-1984)

CESSNA CITATION 550/551 SP (1978-1984)

FALCON 10/100 (1973-1985)

FALCON 20/200 (1966-1985)

GATES LEARJET 23/24F (1965-1979)

GATES LEARJET 25/25G (1968-1984)

GATES LEARJET 35/36 (1974-1986)

ISRAEL COMMODORE JET 112/1123 (1965-1975)

ISRAEL WESTWIND 1124 (1976-1986)

MITSUBISHI MU300 DIAMOND (1982-1985)

SABRELINER 40 — 40A (1964-1974)

SABRELINER 60 (1967-1978)

SABRELINER 65 (1980-1981)

SABRELINER 75A (1974-1978)

TURBOPROPS

BEECH KING AIR 90 — C90A (1965-1986)

BEECH KING AIR E-90 (1972-1981)

BEECH KING AIR F90 SUPER KING AIR (1979-1986)

BEECH KING AIR 100 — A100 (1969-1979)

BEECH KING AIR 'B100' (1976-1983)

BEECH SUPER KING AIR 200 (1974-1986)

CESSNA 425 CORSAIR — 425 CONQUEST I (1981-1986)

CESSNA 441 CONQUEST — 441 CONQUEST II (1978-1986)

FAIRCHILD MERLIN 31A — MERLIN 300 (1967-1986)

FAIRCHILD MERLIN IV — IVC (1971-1986)

GULFSTREAM COMMANDER 680 TURBO — 681B (1966-1972)

GULFSTREAM COMMANDER 690 — 900(690D) (1972-1985)

GULFSTREAM (G-159)GI(1958-1969)

MITSUBISHI MU2B — MARQUISE/SOLITAIRE (1967-1985)

PIPER CHEYENNE I PA-31T1-500I — IA PA-31T500 IA (1978-1985)

PIPER CHEYENNE PA-31T-620 — CHEYENNE II (1974-1983)

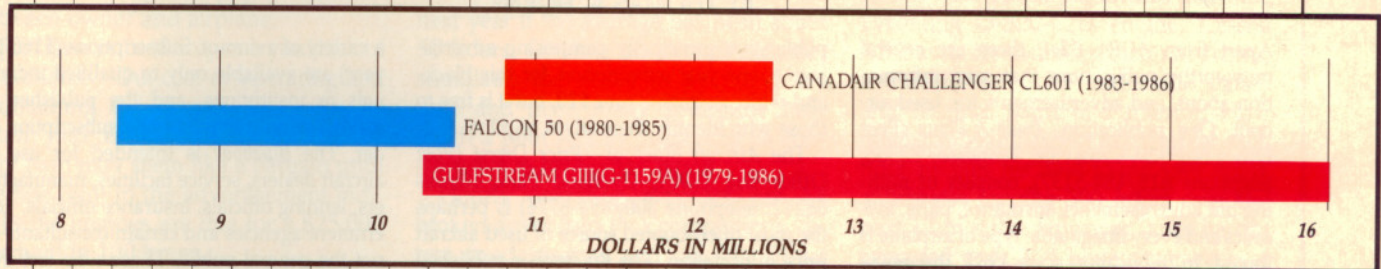
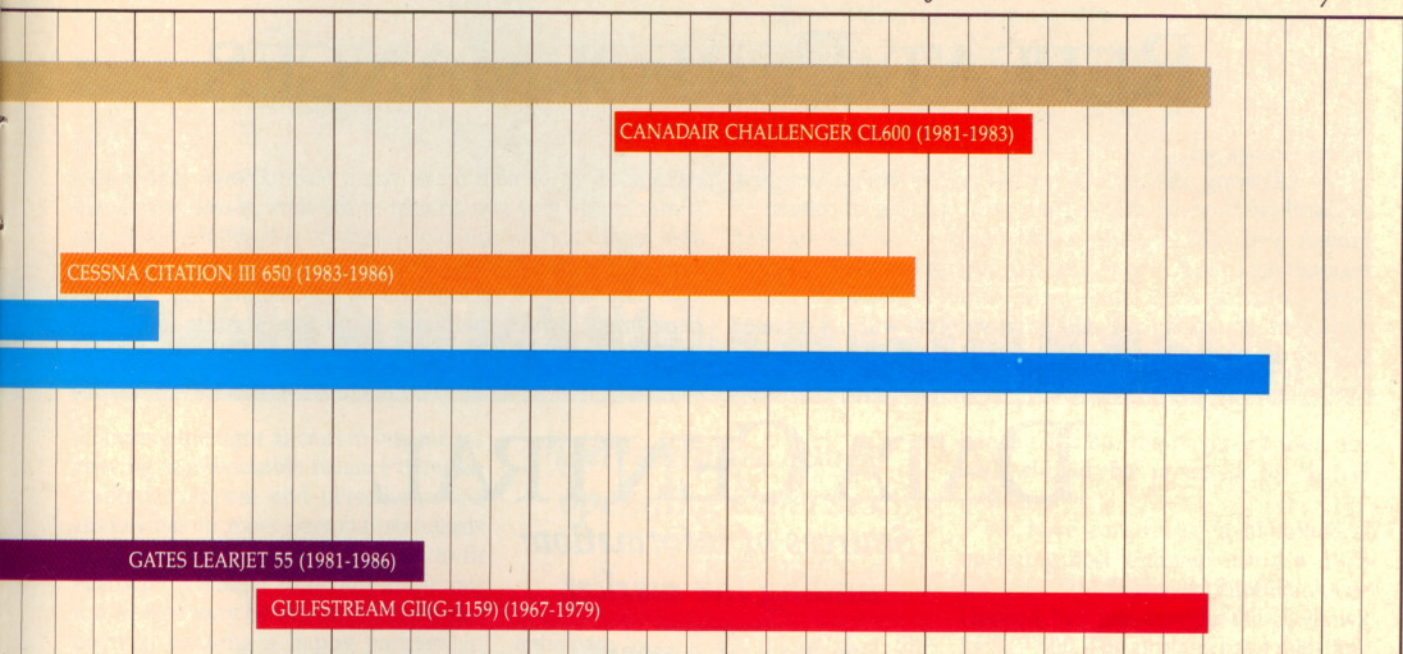
PIPER CHEYENNE III PA-42-720 — IIIA (1980-1986)

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KEROSENE ALLEY

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REPEAT PERFORMANCES

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In the following articles, AOPA Pilot editors have attempted to distill years of experience (our own and that of others) to provide you with a guide to the basics of purchasing and maintaining a used aircraft. Our essays on prepurchase inspections, operating costs, spare parts support, insurance, titles, documentation, financing and other subjects will not answer all your questions, nor are they intended to. Their purpose,

collectively, is to help make you a more knowledgeable consumer and to give you an idea of the sorts of resources available to you and the kinds of questions you should ask as you explore the possibilities. (For answers to specific questions, you may wish to consult the AOPA membership services department, which maintains a toll-free number [800/872-2672] for just this purpose.) □

DATA CENTRAL

Sources of information: finding the market.

BY THOMAS A. HORNE

Apart from *AOPA Pilot*, there are several noteworthy publications that carry information about, and advertisements for, used aircraft. One publication, *Trade-A-Plane* (Post Office Box 929, Crossville, Tennessee 38555; telephone 615/484-5137), consists of nothing but advertisements. Insurance, parts, avionics and every imaginable type of airplane is touted. In publication since 1937, the newspaper is an oversize-format tabloid printed three times per month. Issues generally run well over 100 pages. Subscriptions are \$84 per year at first-class postal rates (\$42 for six months); third-class rates run \$22 per year (\$11 for six months). Need a pair of wings from a 1974 Cessna 150? Oversize cargo doors for your MU-2? A DC-6, or a swaging tool? If you need it, or want to get rid of it, try *Trade-A-Plane*.

The "ARCAP" section of the Business Publications Division of Murdoch Magazines' *Business and Commercial Aviation* (B/CA, Post Office Box 5850, Cherry Hill, New Jersey 08034) contains display advertisements for aircraft for sale or lease, principally turbine aircraft. An annual subscription costs \$30.

The A/C Flyer is another monthly magazine published by the Business Publications Division of Murdoch Magazines (*The A/C Flyer*, Post Office Box 5885, Cherry Hill, New Jersey 08034). It contains numerous color display advertisements of used aircraft, with a slant toward turbine twins and corporate jets. Feature articles address the interests of those in the aviation marketplace. Issues contain articles on such subjects as modifications and overhaul facilities, and an FBO/facility directory and maintenance directory appear on a regular basis. A one-year subscription is \$24.

The Aircraft Bulletin (50 West 34th Street, Suite 10A9, New York, New York 10001; telephone 800/243-7410) is another monthly

publication principally comprising advertising. A one-year subscription for this black-and-white magazine runs \$20, but it is free to those who identify themselves as pilots.

The *Aircraft Bluebook—Price Digest* (Post Office Box 12901, Overland Park, Kansas 66212; telephone 800/654-6776) is perhaps the most often-quoted source of used aircraft price information. The *Bluebook* is published four times a year (spring, summer, fall and winter) and tracks average retail prices of the entire production runs of over 70 different aircraft manufacturers. Also included is a list of airworthiness directives, arranged according to date of issue, and price information on

a variety of avionics. Subscriptions (\$160 per year) are available only to qualified individuals or institutions, and the publisher reserves the right to refuse any subscription order. The *Bluebook* is intended for use by aircraft dealers, service facilities, manufacturers, lending officials, insurance officials, government agencies and certain consultants—not the general public. Those who feel they are qualified must submit proper affiliation identification with their subscription orders. The fortunate few who obtain subscriptions will not be disappointed, as the *Aircraft Bluebook-Price Digest* contains hundreds of pages of densely packed information. □

BUZZWORDS

As prospective buyers of used aircraft pore over classified and display advertisements, there is apt to be some confusion. To keep costs down, advertisers use certain abbreviations to indicate an aircraft's condition or features. A time—expressed in hours—usually precedes these abbreviations. The following glossary translates the most common of these shorthand phrases.

0SFRM—Zero time since factory remanufacture
 0SMOH—Zero time since major (engine) overhaul
 COMP—Compression
 C/R—Counter-rotating (propellers in twin-CSPD—Constant speed (propeller)
 Cycles—In turbine engines, a cycle is from start to full power to shutdown engine airplanes)
 FWF—Firewall forward
 MDH—Major damage history
 MSP—Maintenance service plan
 NDH—No damage history

NoFWF—No firewall forward (engine and propeller missing)
 OXY—Oxygen system
 SCMOH—Since chrome (cylinder) major overhaul
 SFRM—Since factory remanufacture
 SHS—Since hot section (overhaul of a turbine engine's power compressors and turbines)
 SMOHA&E—Since major overhaul, airframe and engine(s)
 SMOHRE/LE—Since major overhaul right/left engine
 SMOH—Since major (engine) overhaul
 SOH—Since (engine) overhaul
 SPOH—Since propeller overhaul
 STOH—Since top (cylinder, piston and valve train) overhaul
 TBO—Time between (engine) overhaul
 TT—Total time
 TTA—Total time, airframe
 TTAE—Total time, airframe and engine(s)
 TTE—Total time, engine
 TTSN—Total time since new —TAH



CALCULATING THE COSTS

Determining hourly operating expenses.

BY MARK R. TWOMBLY

Choosing the right aircraft to buy means arriving at a workable balance between emotional appeal and objectivity. The aircraft has to meet personal standards of style and taste, but it also has to fit needs and a budget. Matching an aircraft to a budget may be the most critical element in assuring a happy partnership between owner and airplane.

Purchase price is only one yardstick of affordability. The cost of operating and maintaining the aircraft also must be taken into consideration. A \$25,000 light twin may seem like a bargain until the fine print in the advertisement indicates the engines are due for a \$25,000 overhaul in 100 hours.

The way to determine the total cost of owning an aircraft is to estimate hourly operating, maintenance and overhaul reserve expenses. There is no trick to estimating hourly costs. Simply add up all of the expenses for one year, and divide by the number of hours flown. Overall expenses go up the more the aircraft is flown, but hourly operating costs go down.

The most common mistake made in computing hourly costs is an error of omission. Not all expenses are considered, and therefore the figure does not represent the true cost of owning and operating the aircraft. It is easy to overlook the cost of a propeller overhaul or a reserve fund for replacing avionics, for example. Manufacturers' estimated aircraft operating costs often paint a rosier picture than what owners actually experience, partly because not all costs are included. Loan payments and unscheduled maintenance may not be factored into the computations, for example. Manufacturers also tend to overestimate the hours owners will fly the aircraft, resulting in a lower hourly cost.

To arrive at a realistic estimate of hourly operating costs, make an honest assessment of use. It is unreasonable to

anticipate logging 500 hours over the next year if the average has been about 50 hours. Owning an aircraft certainly stimulates the desire to fly more, but time and need really determine how much a pilot will fly. It pays to be conservative in estimating usage.

Hourly operating expenses can be broken down into four components: direct, fixed, reserves and variable. Direct costs are out-of-pocket expenses: fuel, oil and landing fees. The amount depends directly on how much the aircraft is flown. Fixed expenses do not change with flying time. These are bills that must be paid regardless of how much or little the aircraft is flown: insurance, hangar or tiedown fees, annual inspection, state and local personal property taxes or registration fees for the aircraft and, if applicable, principal and interest on the loan used to purchase the aircraft in the first place.

Reserve funds should be established to pay for expensive engine, propeller, avionics and airframe overhauls. Ideally, the owner pays into an escrow fund each time the aircraft is flown so that when it comes time to schedule a major overhaul, the money to pay for the work will be on hand.

The spoiler in estimating aircraft operating costs is variable expenses, which usually derive from unscheduled maintenance. No one can predict with certainty if and when a vacuum pump, starter or radio will fail. An unanticipated repair can devastate a carefully constructed budget. Owners of new aircraft covered by a warranty have some protection against unscheduled mainte-

nance bills, but the buyers of used aircraft should be prepared for a few problems.

We have constructed a hypothetical operating cost estimate using a 1975 Cessna 172M Skyhawk. Pilot Frank Lee Hooked has just bought the Skyhawk for \$19,500. The airplane has a mid-time Lycoming O-320-E2D engine, Cessna ARC avionics including dual nav/coms, a transponder, ADF and audio panel, and original paint and interior. How much can Frank expect to spend for each hour he flies his new-found joy? Frank anticipates logging 300 hours over the next 12 months. However, since he has averaged only 100 hours over each of the last three years, he decides to make two estimates, one based on 300 hours usage, the other for 100 hours.

Frank's research includes a call to the Cessna Pilots Association (Wichita Mid-Continent Airport, 2120 Airport Road, Post Office Box 12948, Wichita, Kansas 67277; telephone 316/946-4777). He is told that a Skyhawk owner who helps maintain the aircraft and who shops around for the best prices on fuel, oil, parts and repairs can expect to pay about \$30 an hour in expenses, not including financing charges. Additional research reveals that Skyhawks are prone to certain problems: worn nosewheel struts and seals from nosewheel-first landings, worn seat tracks and a cracked elevator bellcrank bracket caused by gust loads, placed on the elevator surface with the control lock in place. These are potential unscheduled maintenance items.

With those thoughts in mind, Frank begins to compute expenses for the aircraft. For direct costs, he figures \$14 an hour for fuel, 92 cents per hour for oil and \$50 annually for landing fees. The fuel estimate is based on fuel consumption of eight gallons per hour at \$1.75 per gallon, which was the national average price for 100LL avgas in March 1987

(see "AOPA Fuel Watch," April *Pilot*, p. 93). The Skyhawk owner's manual claims 7.4 gallons per hour at 5,000 feet and 2,500 rpm (68-percent power), but Frank makes an allowance for climbing and less-than-optimum performance due to the aircraft's age. The previous owner of N7575H said the aircraft uses one \$2.76 quart of oil every three flying hours, or 92 cents worth of oil per hour. Landing fees are difficult to estimate, but Frank knows that the airport he flies to once a month on business trips charges a \$2 landing fee. He adds \$26 for unanticipated landing fees at other airports for an annual cost of \$50. That breaks down to 50 cents per hour if he logs 100 hours, or about 17 cents per hour if it turns out to be a busy flying year.

Next are the fixed costs: insurance, annual inspection, storage, state registration fees and the loan payments. Regardless of how much he flies, Frank will pay about \$1,000 for insurance. That includes a \$740 annual premium for hull insurance and a \$256 premium for liability (\$50,000 coverage for each person and \$500,000 for each accident). Those rates would be about \$200 lower if Frank, a VFR-only private pilot with 500 hours logged, had an instrument rating and at least 650 hours, but it will be about a year before he reaches that level.

Frank anticipates the cost of the annual inspection at \$800. He bases the estimate on the factory claim of about 15 hours to perform a Skyhawk inspection, at \$30 an hour for labor, for a total of \$450. The remaining \$350 is a fudge factor. He knows the previous owner probably deferred some discretionary maintenance that may have to be done by the time the annual is due. The local fixed-base operator charges Frank \$100 a month for hangar storage, and his home state charges an annual \$100 registration fee for the Skyhawk.

The final item in the list of fixed costs is the loan payment. Frank put \$5,000 down on the Skyhawk and financed the remaining \$14,500 with an AOPA/Maryland National Bank Air Power loan. As an AOPA member, Frank was given a choice of a variable interest rate of 9¼ percent (1.5 percent over prime rate as of March 1987), or a fixed rate of 11 percent. He chose the fixed rate and agreed to a seven-year loan with monthly payments of \$248. Had he financed the entire \$19,500, he could have extended the terms to 10 years for a monthly payment of \$269.

(Terms are more restrictive and interest rates higher for non-AOPA members who finance aircraft purchases with Maryland National. For more information, telephone Ted R. Fleming at 800/826-2561 or contact the bank's telemarketing service at 800/423-7800 or 800/543-3559.)

Frank decides to play it safe and establish reserve accounts for engine, avionics and airframe overhauls. His research indicates that a major overhaul of the O-320-E2D engine in his Skyhawk ranges from about \$5,500 to \$7,500. However, installation, new engine shock mounts, oil cooler hose, filters, oil and testing add significantly to the cost. Frank settles on a shop experienced in Skyhawk engine overhauls that quotes an average fly-away price of \$6,460. Frank rounds the figure to \$7,000 to allow for price increases, knowing that it should be at least three years before the engine reaches the 2,000-hour time before overhaul (TBO) milestone.

The Skyhawk had been based at an airport in the Midwest with a hard-surfaced runway, and the 75-inch-diameter McCauley propeller is in good shape. It does not appear that the prop will have to be replaced (at a cost of \$2,006) as long as Frank has the nicks filed away to preclude the propagation of stress points.

The Skyhawk's avionics are another story. Frank does not put much faith in the two nav/coms. The previous owner noted that the number one nav/com occasionally malfunctions for brief periods, and the number two nav is erratic. Fortunately, the automatic direction finder, transponder and altitude encoder work fine. Frank plans to begin his instrument training in a year, but he wants reliable radios. The local avionics shop quotes him an installed price of \$6,500 to replace the ARCs with new digital-display nav/coms and a new audio panel. Frank swallows hard, but makes plans to have the work done just before starting his training. The cost will be amortized over five years.

There are two other major projects Frank factors into his operating budget. The aircraft is beginning to look a little frayed around the edges. He can live with it for a while, especially since the airplane will be hangared, but he makes up his mind to have it painted and the interior refurbished in the near future. As with the avionics, the cost of the paint job, which he estimates at \$3,000, and the interior refurb, estimated at

\$1,000 for a kit he can install himself, will be spread out over five years.

The last and most nettlesome category of costs Frank has to consider is unanticipated expenses. Into this smorgasbord of unscheduled maintenance will go shop receipts for fixing or replacing failed engine accessories, silent radios, flat tires and thin brake linings. It is tempting to discount the chances of such emergency repairs popping up given Frank's meticulous care and the simplicity of the Skyhawk, but he knows that 12 years and 1,000 hours have to have taken their toll on the airplane. Frank budgets for \$500 annually in unscheduled repairs.

Now that he has identified all the costs, it is time to figure the bottom line. Frankly, he is not prepared for the numbers that appear on the display of his electronic calculator. Logging 300 hours a year, Frank will pay \$50.98 per hour to operate the Skyhawk. At 100 flight hours each year, the cost will be \$109.18. The total annual costs are \$10,918 for 100 hours and \$15,294 for 300 hours.

He refigures, cutting discretionary expenses to the bone. The new radios, paint and interior are struck from the budget. Frank resolves to do as much of the maintenance work himself as regulations allow and therefore trims the line items for unscheduled maintenance and the annual inspection. Giving up the hangar for an outside tiedown spot cuts storage expenses in half. The bank loan and insurance expenses are locked in and cannot be adjusted.

Frank punches the buttons of his calculator to figure the new totals: \$72.18 per hour for 100 hours annually, and \$40.50 for 300 hours. That's much better, but he still is uneasy. Frank realizes he is only fooling himself by not planning for airframe and avionics improvements, and underestimating the cost of repairs and the annual inspection. He returns to his original estimates, knowing he will be prepared for the unexpected and that the aircraft will be properly maintained.

Besides, there are two sides to a balance sheet. Offsetting the expenses will be the equity Frank builds in the Skyhawk. In fact, some aircraft owners absorb the cost of improvements such as new paint, interior and radios rather than factor the cost into hourly operating budgets because the investment is reflected in increased equity which is returned when the aircraft is sold. If Frank

does that, his operating expenses decrease about \$7 an hour with 300 hours of use a year, or \$21 an hour at 100 hours annually.

There are other benefits Frank will re-

alize that can't be displayed on a calculator: the convenience of setting his own flight schedule rather than adjusting it to an FBO's, and the peace of mind that comes from knowing the aircraft is well

maintained and safe to fly. Finally, there is the pride that will flow when Frank tells friends and business associates that not only is he a pilot, he also is an aircraft owner. □

PREPURCHASE INSPECTION

A prepurchase inspection is not an annual inspection, although the buyer and seller could agree to such an arrangement. The object is to examine the aircraft for damage and wear that might not be evident to an untrained eye and to form an educated guess as to maintenance problems that might arise in the future.

Obviously, the outcome of a prepurchase inspection is likely to affect price. If a mechanic discovers a serious problem, the buyer is not likely to close the deal without a reduction in price equal to the cost of the repair. For that reason, the seller may be wary of such an inspection. Nevertheless, it is to the buyer's advantage to insist upon one. The aircraft may be found to be unairworthy because of faulty equipment or lack of compliance with an airworthiness directive. Once the deal is closed and the buyer takes possession of the aircraft, it will be extremely difficult to force the previous owner to bear the cost of repairs that should have been performed before the sale.

A small investment now could preclude major expenses later.

BY TERRY L. DILL

The extent of a prepurchase inspection depends upon the complexity of the aircraft and the wishes of the buyer. Because of the complexity of its systems, a late-model, turbocharged Cessna 210 requires a more thorough check-out than a simple Ercoupe. A wood-wing aircraft should be inspected for rotting or drying of the wooden components. Fabric-covered aircraft should be subjected to punch tests.

The buyer may be able to specify the shop conducting the inspection or annual, but usually it is the seller who rules in this decision. If that is the case, the buyer is well advised to evaluate the shop's credibility and reputation. The inspection could amount to a "paperwork annual" in which the mechanic

does his work looking through an office window, fingers attached to coffee cup.

Poor annual inspections technically may not be fraudulent, but there have been incidents of improper repairs using stove bolts, hardware-store pop rivets and other atrocities that cost a new owner with a fresh annual more than \$5,000 to rectify. There is legal recourse in such cases, and the Federal Aviation Administration probably will be interested in a visit with the inspector, but the aircraft owner still loses money and use of the aircraft.

Following is a check list of items that should be covered on a thorough prepurchase inspection. Many of the checks can be performed by the buyer, but a properly qualified authorized inspector (AI) or airframe and powerplant mechanic (A&P) should be retained to examine critical items such as the engine and logbooks. □

Terry L. Dill, an airframe and powerplant mechanic, is an authorized inspector and an instrument-rated commercial pilot.

CHECKLIST

1. Paperwork. Check to see if the following are in order:

A. Valid airworthiness certificate, current registration, operating limitations/placards, weight and balance with current equipment list, pilot's operating handbook.

B. Engine and airframe logbooks. Check for complete maintenance history, airworthiness directive and service bulletin compliance and also entries that suggest repairs due to an accident or incident.

C. Title search. Insist on one to ensure there are no liens against the owner that may affect financing or your ability to sell the aircraft.

2. Engine.

A. Is it clean and dry? Be wary of a spotless engine compartment that may have been treated to a "spray-paint" overhaul. Check the source of fluid leaks.

B. Baffles. Eroded, misshapen baffles may be a sign of improper engine cooling over an extended period.

C. Induction/exhaust systems. Check for corrosion, leaks, worn gaskets and loose

connectors.

D. Cylinder compression check.

E. Battery condition.

3. Empennage.

A. Horizontal and vertical stabilizer attach points. Check for play and loose rivets.

B. Elevator/stabilator attach hinges. Examine for excessive play in worn hinges. Replacing them can be very expensive.

C. Rudder trailing edge. Look for dings (minor dents) or putty that would indicate hangar rash and potential control problems.

4. Wings, ailerons, flaps

A. Look for wrinkles, warps and chafing rivets. Pay particular attention to clean, freshly painted or waxed aircraft. It may be more difficult to spot problem areas.

B. Look for dings that may have to be repaired on leading edges of wings and trailing edges of ailerons and flaps. Check the undersides of wings near jack points for dings. Check wingwalks or strut steps for dents, corrosion and worn-off rivet heads.

C. Fuel caps and drains. Look for fuel stains around seams, rivets and wing roots. This may indicate leaking tanks or bladders or, in a wet wing, leaking sealant.

5. Fuselage.

A. Doors, hinges and latches. Are all hinges in place and free of rust or corrosion? Do doors close easily and with a tight seal?

B. Skin. Look for wrinkles or warping. Some "oil canning" is acceptable.

C. Belly. Look for scrapes, dents, replacement panels and patches that indicate a gear-up landing. While gear-up landings that result in minor damage need not affect the value of an aircraft, the logbook entries should reflect the repairs.

D. Antennas. Are they properly located for best reception and transmission? Is the fiberglass coating eroded? Have all antennas been mounted properly?

6. Landing gear.

A. Struts. Check for leaks, proper extension of struts, integrity of hardware.

B. Brakes. Check condition of discs and rotors. Don't forget to test the brakes to see if they are effective.

C. Tires. Are the sidewalls dried and cracked?

7. Cabin or cockpit.

A. Seats, tracks, backs, seat belts and shoulder harnesses. Check for wear.

B. Instruments and avionics. Test them all—thoroughly. —TLD

OUT OF STOCK

There may come a day when corrosion or structural damage may necessitate the replacement of an airframe part. Where will you find a new wing flap or tip tank? Cessna may not have one in inventory and may not be willing to build one for you. Chances are, however, that your mechanic will track one down in a salvage yard. It is through such cannibalization that many aircraft are kept airworthy these days.

The General Aviation Manufacturers Association estimates that the average piston single is 19 years old; the average piston twin, 15. In a society where rapid product obsolescence is the norm, the aviation industry, to its credit, turns out highly durable products, but the longevity of general aviation airplanes has created unprecedented inventory problems for manufacturers.

Nevertheless, few airplanes have been permanently grounded for lack of replacement parts. The level of factory support, in general, is quite good, given the number of out-of-production models. Gulfstream still supports the discontinued Grumman American singles, as well as the Rockwell piston and turbine lines. Beech provides parts for its Sports, Sundowners, Sierras and Duchesses. Indeed, Beech still builds some parts for the earliest Bonanzas, which are nearly 40 years old. Cessna, though it has suspended production of its entire piston line, continues to support a vast fleet of used airplanes. Piper still produces parts for most of its models, though the company's parts-support program has been disrupted by the consolidation of three manufacturing sites into one at Vero Beach, Florida, and also by the temporary closure of most of its production lines. In many instances, the oldest light airplanes, such as Aeroncas, Cubs, Taylorcrafts and Luscombes, enjoy excellent support, often at quite reasonable prices, from outfits such as Univair, Incorporated (2500 Himalay Road, Aurora, Colorado 80011; telephone 303/364-7661), and Wag-Aero (Box 181, 1216 North Road, Lyons, Wisconsin 53148; telephone 414/763-9586).

The great worry for any used airplane owner or buyer is that general aviation manufacturers will simply cut off support for discontinued models. Many pilots suspect that factories will cease supporting older airplanes as a means of

Are we reaching the bottom of the parts bin?

BY J. JEFFERSON MILLER

grounding them, thereby reducing a company's liability exposure and spurring demand for new airplanes.

Aviation executives insist this will not happen. In a letter to the Cessna Pilots Association, Cessna Senior Vice President Brian E. Barents wrote: "Cessna remains committed to the service support of our piston aircraft products. That commitment continues even though market conditions have forced us to significantly reduce staffing in all areas of the company." However, Barents added, the company is "evaluating the extent of engineering support for aircraft over 20 years old." These aircraft include Cessna 120s, 140s, 170s, 195s and other models. Such a policy could have serious implications for owners of these airplanes. According to Cessna's director of corporate public relations, H. Dean Humphrey, it means that Cessna may no longer issue service bulletins or aircraft manual revisions for these aircraft. If vendor parts become unavailable, as often happens with older models, Cessna may no longer develop modifications that will allow other parts to be substituted. In these circumstances, aircraft owners or smaller aviation firms may have to apply for supplemental type certificates in order to modify their aircraft.

Piper spokesman Joseph Ponte Jr. stated that his company intends to continue to support a fleet of 65,000 aircraft worldwide. Piper has ceased building parts for its earliest models, the Cub and its derivatives, and refers customers to Univair, which makes a wide range of parts for these aircraft. Piper still builds parts for the Super Cub, however. Piper also has entered an agreement whereby Duncan Aviation (Post Office Box 81887, Lincoln, Nebraska 81887; telephone 402/475-2611), will manage product support for other older Pipers, such as the out-of-production Comanche, Apache and Aztec. Piper builds the parts for these airplanes, but Duncan handles the distribution.

Aircraft users nevertheless remain skeptical of manufacturers' claims of

continued parts support. John M. Frank of the Cessna Pilots Association complains that "Cessna has a huge backlog" of parts orders, leaving owners to wait weeks or months for components. The backlog appears to stem from at least three problems at Cessna. First, the suspension of all piston model production means that the assembly lines for these airplanes have been shut down and the skilled workers who manned them laid off. Many aircraft jigs now sit outside, exposed to the elements. To produce a part, Cessna must set up a jig and pull workers off an active assembly line to produce a short run of the item. Since the workers may not be experienced in producing the part, they may have to come up a learning curve. This learning process may result in quality control problems, and some parts may be rejected or reworked. All of these factors add up to more time and expense to produce a small number of parts. "It used to be that if an owner had an AOG [aircraft on the ground], we could pull a part right off the assembly line. It's much harder to produce that part now," says Humphrey. These problems are common to other manufacturers that have suspended or discontinued product lines. Mooney suffers the least in this regard because it has been producing essentially the same airframe for more than 20 years.

Second, as with other manufacturers, Cessna has had great difficulty maintaining a network of vendors who supply small parts and sub-assemblies. Items as simple as rubber seals for fuel caps are hard to come by because many vendors, frightened about the potential for product liability claims, simply will not take orders from general aviation manufacturers. Furthermore, when one vendor refuses to renew a contract, a new vendor must be found. Often, the new vendor will not have access to proprietary information concerning the part the old vendor was making. Therefore, the new vendor must in effect reinvent the part. These development and tooling costs are then passed on to the consumer.

Third, Cessna is in the process of implementing a new computerized inventory control program, known as Manufacturing Resources Planning II (MRP II), as a means of reducing inventory

costs and ensuring that all necessary parts appear on the assembly line at the right place and at the right time. The program also involves Cessna's product support inventory. The system is still being debugged and has contributed to the parts order backlog.

Eighty-nine to 90 percent of all parts orders are currently filled directly from Cessna's inventories. The company expects to be filling orders from inventories at a rate in the low 90s by the end of this summer. In March 1987, Cessna increased prices on Cessna-manufactured parts by 30 percent. The price of vendor parts increased eight to 10 percent. In 1986, the average price of Cessna parts actually decreased by 4.5 percent.

Piper, which has suffered from a poor reputation among pilots and mechanics for product support, is now filling 92 percent of orders from stock, according to the company. Shortly after the closing of Piper's Lock Haven, Pennsylvania, and Lakeland, Florida, facilities, the company was able to fill only about 75 percent of orders. In July 1986, the company raised prices on Piper-manufactured parts by 77 percent. The price increase was due to higher labor rates, product liability expenses and reduced production volumes, said company executives Douglas H. Smith and Royce A. (Gus) Reinwald. Vendor parts also increased in price, but the executives could not say how much because these prices were not raised across the board as were the Piper-built items. Since January 1987, Piper has been reevaluating its parts pricing strategy, according to Smith and Reinwald. "We are overhauling our approach to the business in order to better satisfy the requirements of

Piper owners. We intend to get prices down, to make them competitive on a part by part basis," said Smith.

While Piper and other companies struggle to support their more recent models, at ever higher prices, there are many indications that support for older models is waning. Particularly hard to come buy, say mechanics, are aircraft skins and other airframe parts. "It is often quicker for us to make these parts ourselves," says Keith A. Skidmore of Alphin Aviation in Hagerstown, Maryland. Alphin specializes in repairing damaged aircraft. John Frank complains of problems in obtaining parts for Cessna Cardinals, which were built in relatively small numbers compared to other Cessna models. While stating that support from the Beech factory has been good, Bonanza maintenance expert J. Norman Colvin of the American Bonanza Society acknowledges that Bonanzas made before 1953 are very hard to support. It has become difficult, he says, to obtain parts for the E-series Continental engines that powered the early Bonanzas and virtually impossible to find a serviceable Beech electric propeller for these airplanes. Replacing a worn-out electric propeller with a new Hartzell hydraulic prop costs nearly as much as the value of the airplane. However, many Bonanza parts, such as landing gear doors, will fit any Bonanza and are still available from Beech.

As a result of these and other support problems, an alternative aircraft support network is developing to care for these older airplanes. Small companies now build plastic fairings, door panels and interior parts for certain Cessna models. Firms such as Univair and Wag-Aero offer parts for a variety of makes and mod-

els. Parts dealers such as Duncan Aviation's Av-Pac Division (Post Office Box 81530, Lincoln Municipal Airport, Lincoln, Nebraska 68501; telephone 402/475-4125) specialize in stocking parts for older aircraft.

Aircraft mark societies, such as the American Bonanza Society and the Cessna Pilots Association, are clearing houses for information on parts. "The most popular product we have is our list of salvage yards," says CPA's John Frank. "We have a list of 70 yards and offer it to our members for free." The Bonanza Society's Colvin says he handled 2,300 calls last year, half of them parts inquiries. When called for this report, he commented, "I've been looking for parts all day." The ABS includes in its newsletter a parts exchange, in which members can list parts they no longer need and seek parts they do need. The Swift Museum Foundation provides the ultimate parts service. The foundation purchased the type certificates, tooling and inventories for the Swift and now provides parts support to members. (Addresses for associations appear under "Aviation Organizations" in *AOPA's Handbook for Pilots 1987*.)

The message for buyers of used aircraft is clear. The cost of maintaining an older aircraft is largely a matter of replacing parts as they wear out. This cost can be quite high. The older the airplane, the more acute the parts problem becomes. The rarer the airplane, the more difficulty one may encounter in tracking down parts. Before you buy, determine what resources are available for locating and obtaining parts. And when you buy, remember that today's bargain can be tomorrow's bottomless money pit. □

CLEARING THE RECORD

An aircraft title search can cure a case of the liens.

BY MARK R. TWOMBLY

One of the more important but often overlooked items on an aircraft purchasing check list is a title search. It may not be required, although financing institutions usually insist upon it, but consider it a relatively inexpensive form of consumer protection.

You buy a used aircraft for cash, fly it for two years then decide to upgrade to a

new, faster model. An ad for the trusty old bird attracts a prospect, who, before handing over the check, asks that a title search be conducted. The search uncovers an old but unresolved lien against the person from whom you bought the aircraft, and the sale falls through. Now you are faced with the potentially time-consuming and expen-

sive task of clearing up the problem. If you had insisted on a title search two years earlier, the previous owner would have been obligated to resolve the issue.

A title search is a visual inspection of aircraft documents on file in the Airmen and Aircraft Registry at the Federal Aviation Administration's Mike Monroney Aeronautical Center in Oklahoma City.

It is not a title search in the strictest sense of the term, since aircraft do not have titles. Either a certificate of registration, bill of sale, contract of conditional sale, transfer of interest agreement, court order or an affidavit are considered by the FAA to be evidence of ownership. The objective of a title search is to determine if there are liens or other security encumbrances outstanding on the aircraft—in other words, to determine if the person, partnership, corporation or governmental unit claiming to own the aircraft does indeed retain title, or if ownership is clouded by outstanding debts.

The most common type of lien is an aircraft chattel mortgage or security agreement filed by a financing institution when a loan is provided to buy the aircraft. The aircraft serves as the security for the loan. If the borrower does not pay off, the holder of the lien has a legitimate claim against the aircraft, and ownership cannot be transferred without the financier's consent. These are consensual liens; the aircraft owner agrees to the lien in exchange for the loan. A word of caution: Banks and other financing institutions often neglect to notify the FAA when a loan is paid off, an oversight that can cause embarrassment to the aircraft owner and an unnecessary delay in sale of an aircraft. The FAA is supposed to provide lien holders with form AC-8050-41, which contains a release provision. An aircraft owner who pays off a loan should check with the bank to make sure the lien release has been sent to Oklahoma City in a timely manner.

Artisans' or mechanics' liens also can be filed with the FAA under certain circumstances. These are liens prompted by an aircraft owner's alleged failure to pay for labor, materials or storage related to the aircraft. In the past, the FAA accepted most artisans' liens without question, even though the lien may not have been valid under the laws of the state in which the lien originated. State law governs artisans' liens, and many states require that the lien-holder maintain possession of the aircraft in order to file a valid lien. Some states do not even provide for artisans' liens, so none can be filed. The FAA now refuses to accept an artisan's lien that does not meet applicable state law; however, a copy of the FAA's letter rejecting the claim is placed in the aircraft file. That could cause problems in the future if the letter is construed by a potential purchaser or

financing institution to mean that a valid lien may be forthcoming.

Ownership may not be in question at the time of purchase, but it is conceivable that a lien subsequently may be filed against the previous owner that could affect the new owner's ability to sell the aircraft. Title insurance is available that pays any costs associated with obtaining a release of the lien.

Liens are effective against third parties as of the date of filing. The process begins when the claim of lien is received by the FAA in Oklahoma City. The FAA can provide claim forms, but any document is acceptable as long as it adheres to applicable state laws and the provisions of Federal Aviation Regulation Part 49, Recording of Aircraft Titles and Security Agreements. The claim is stamped and given a number that is listed on an index of work in progress. It takes about six weeks for the FAA bureaucracy to verify and approve the claim. When approval is granted, the lien is stamped as recorded and filed

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with all other official records pertaining to the aircraft, including copies of all certificates of registration and bills of sale that have been issued since the aircraft was manufactured and the application for an airworthiness certificate. The file also may contain a record of modifications that have been performed and approved, weight and balance information and perhaps an equipment list, but these are not required. Aircraft documents used to be kept in file folders, one folder per aircraft. Over the last seven years, the files have been converted to microfiche records. Most files contain two sheets of microfiche, with each four-by-six-inch sheet containing up to 60 pages of documents.

Filing a lien constitutes constructive notice, even though it has not yet been approved. From that point on, it is not possible for someone to plead ignorance of the lien. When a title search firm checks an aircraft file for liens, it also checks the index of claims under review. According to title search professionals,

aircraft financing firms treat the discovery of a lien that has been filed but not yet approved and recorded as tantamount to a finding that ownership of the aircraft is not clear. The title search firm does not give an opinion as to the validity of a lien; it only reports that one or more exist in the aircraft file. It is up to the owner or potential buyer to clear the record. That may require no more effort than a telephone call to a bank to secure a release, or it could involve a lengthy, expensive legal battle. Complications arise if the previous owner has relocated or if the firm that filed the lien has gone out of business. The only recourse may be to persuade a court to declare the lien invalid.

How can these potential headaches be avoided? Before buying an aircraft, insist that a title search be done. If the investigation uncovers a question as to unencumbered ownership of the aircraft, make the purchase contingent upon clearing the record. Once the purchase is completed, the only motivation for the previous owner to assist in obtaining a release of an outstanding lien is his integrity.

Aircraft records on file at the Mike Monroney Aeronautical Center can be examined by anyone. You can do it yourself, hire an attorney or pay a professional title search firm to conduct the review. Companies qualified to conduct aircraft title and records searches are listed on FAA AC Form 8050-55, Title Search Companies.

AOPA has maintained an Aircraft and Airmen Records search service in Oklahoma City for the last 25 years. Ann M. Lennon has been the director since its inception, assisted by 11 technical specialists with 97 years of combined experience in the field. Services offered include title searches, airworthiness directive listings, service difficulty and accident/incident reports and aircraft title insurance. Specialists can research the complete ownership history of any propeller-driven or jet-powered aircraft, conduct engine and propeller lien searches, submit documents, reserve and assign N numbers and perform other custom services. The services are available to anyone, but AOPA members receive a discount. For more information, contact the Aircraft and Airmen Records Department, Box 19244, Southwest Station, Oklahoma City, Oklahoma 73144; telephone 800/654-4700 (Alaska and Oklahoma residents telephone 405/682-2511). □

PROTECTING YOURSELF

What every prospective aircraft owner should know about insurance.

BY SETH B. GOLBEY

Would it surprise you to learn that most states do not require you to carry liability insurance on your aircraft? Or that none require hull insurance? Or that your aircraft insurance policy probably does not cover you, yourself, in the event of death or disability and may not cover your family (or your employees or co-workers) when they fly with you? Insurance is probably the last thing most people want to think about when they prepare to sign on the dotted line for a shiny new (or used) airplane, but the consequences of ignorance can be tragic. It behooves the pilot considering an aircraft purchase to become familiar with the legal ramifications of aircraft insurance.

Insurance is a form of economic self-protection and is available in two different forms. *Hull insurance* protects your investment in your airplane from damage or loss. *Liability insurance* protects you in the event that your aircraft does damage to other people or their property. While no legal obligation to carry hull insurance exists, you will probably be required to obtain it by the lending institution that holds the note on your airplane. If you pay cash for your airplane, or when you pay off the loan, the decision whether to carry hull insurance is yours. And while few states require liability insurance (see box on page 75 for those that do), it is almost a foregone conclusion that, if your airplane causes damage or loss to another person, you will be sued. If you do not carry insurance and are involved in an accident or incident in a state that requires it, your aircraft may be seized. Without insurance, few people are prepared to sustain the financial losses that an accident can bring. Simply "being insured," however, can be useless unless the aircraft owner understands *exactly* the coverage he has purchased.

Just because your hull insurance carries the words "all risk," for instance, you are not necessarily fully covered against any exigency. There are three main types of all-risk hull insurance that cover damage or loss to the airframe,

engine, propeller, avionics and other systems and equipment, regardless of the cause of the accident. *All risk, not in motion* coverage protects your airplane while it is tied down, parked, moored or being moved under power other than its own. *All risk, not in flight* coverage protects the aircraft while it is moving on the ground (or water) under its own power. *All risk* coverage protects the aircraft at all times, on the ground or water and in flight. Bear in mind that, according to most policies, a flight begins when you begin your takeoff roll and ends when you end your landing rollout at your destination. Under such a policy, not-in-flight insurance will not cover you for an accident that occurs on the ground on the active runway (a ground loop, for example). If the words "all risk" do not appear on your policy, payment of a claim may be contingent on the circumstances of the accident.

Another important point regarding hull insurance is that it may not pay actual replacement costs. Some policies

are written for *actual cash value* (ACV)—in other words, the blue book or market value. For an older, fully depreciated airplane, this value might not even approach the actual cost of replacing the aircraft. Some insurance underwriters reserve the right under such policies to simply replace your airplane with one of the same general type and approximate value. Look instead for a *stated value* (SV) policy, in which you state the monetary value you place on the aircraft (within reasonable limits). In the event of a total loss, this is the amount you will be paid, less applicable deductibles (which often vary depending on whether the aircraft is in flight, in motion or not in motion at the time of the accident). If you own an aircraft that is appreciating in value (a restored J-3 Cub, for instance), you must remember to increase your SV from time to time. ACV and SV are referred to as *limits* of coverage. In terms of hull insurance, the limits are fairly straightforward. It is in the realm of liability insurance that limits take on an added importance.

Most policies establish separate liability limits for each accident for *bodily injury*, which may or may not include passengers, and *property damage*. Bodily injury limits are usually stated in terms of the maximum amount *each person* entering a claim may be paid for any single accident. Increasingly, insurance underwriters are issuing *single limit* (sometimes called *combined coverage*) policies in which bodily injury and property damage are lumped together under one inclusive limit of liability. This limit is often notated in the policy as *each occurrence*—in other words, the total amount for which the insurance underwriter is liable for any one accident. Some policies also include limits of *medical expenses*, which may or may not include those of pilot(s) and other crew, that may be paid. The specific wording of a policy depends on the types of coverage offered and the underwriter offering it. It is therefore absolutely essential that you read *and understand* each part of the policy before signing it. If you are confused



by any portion of the policy, do not sign it until it has been explained to your satisfaction.

When you purchase aircraft insurance, the risks from which you are seeking to protect yourself are assumed by an *underwriter*. There are about 20 aviation underwriters, the vast majority of which market insurance to the public exclusively through approximately 50 aviation insurance *brokers*. (These numbers do not include Lloyds of London, which is not itself an underwriter but rather a market comprising hundreds of individuals who assume risks against their personal assets.) Insurance is also available through *agents*, who are licensed by one or more underwriters to sell the underwriters' products. Simplistically, the difference among these three entities is that, whereas the underwriter represents itself and the agent represents one or more underwriters, the broker represents the buyer, just as a stock broker represents the investor and not the companies whose stock he or she helps the investor to buy. Aviation insurance brokers can save the aircraft owner much of the time that might be spent comparison shopping for the coverage sought. Still, there is no reason not to consult a number of underwriters, brokers and agents and compare their quotes. If your needs are very simple, then dealing directly with an underwriter may save you some money, but if you need a custom-tailored policy, a broker will usually check a half-dozen sources for the best coverage at the best price. Remember, however, that you get what you pay for; skimping on insurance is false economy.

How do you select an agent, broker or underwriter? Ask other aircraft owners and fixed-base operators for their recommendations, or call several underwriters for the names of brokers or agents in your area. Find out how long the brokers or agents you are interested in have been in business, what portion of their business is aviation insurance, which underwriters they usually deal with, whether they are pilots themselves. Be sure the broker or agent you select specializes in aviation insurance. While the most insightful sources of information are often pilots and FBOs, be sure to seek out some who have made claims; people seldom have any trouble with their insurance coverage before they file a claim.

No two insurance policies are alike; here again is reason for careful reading, and this is where a broker can be par-



ticularly helpful. First you must establish the type and limits of coverage you need. You certainly do not want to be underinsured, nor is there any reason to pay for more insurance than you require. But how much is enough? The answer is to accurately assess your potential exposure to loss and decide how much protection you need. As indicated above, if you want to be able to recoup your investment in case your airplane is destroyed, you should write your hull insurance on stated value rather than actual cash value. For liability insurance, take a look at your own assets. It is not unknown for a court to award damages in excess of the limits of liability of a policy. If this happens, the remainder will come out of your pocket (or the pockets of your heirs). You may think you are leaving your spouse and children well protected, but if a damage judgment exceeds your insurance limits, your family could lose their nest egg (or

their home). If you fly your airplane on business, a judgment could be awarded against your company—a particularly damaging situation if you are self-employed. (Another consideration: If you fly on business, your company may require you to carry specific limits of liability. Check on this before signing a policy.) If you are single and have little property, low liability limits may be acceptable to you. Nevertheless, even personal bankruptcy might not protect you from significant losses, since in some states future earnings as well as assets may be attached as a condition of the bankruptcy. In any case in which claims are filed against you, adequate insurance is worth considerably more than what you paid for it.

Next, you must read all the fine print; it is here that *exclusions* are usually listed, and it is here that you can often tell a "good" policy from a "bad" policy. Exclusions specify the conditions under

which the underwriter will *not* pay off. Minimize exclusions; you may be able to eliminate most of them, usually in return for higher premiums. One exclusion you certainly do not want is one that invalidates your claim if any Federal Aviation Regulations have been broken; it is all but impossible to have an accident without breaking an FAR. Moreover, the violation need not have a causal relationship with the accident. Fortunately, most policies issued by reputable companies do not carry this exclusion, but never assume this to be true. In a case of gross negligence or flagrant disregard for regulations, of course, any underwriter may question your claim.

Some policies will specify pilot qualifications, an important exclusion if anyone else will be flying your airplane or if you plan to rent it or enter a leaseback agreement. Some policies exclude flights outside the continental United States. Some exclude any of your employees or co-workers who might fly with you, the assumption being that workmen's compensation insurance will cover them (it probably will not, unless the trip was part of an employee's job). Some exclude family members, presumably because your family is not expected to sue you (a dangerous assumption; see "Pilot Counsel: Insurance Coverage: Family Immunity," October 1986 *Pilot*, p. 25). Some policies exclude flights made under a special waiver of the airplane's airworthiness certificate or a ferry permit. Some exclude use of the aircraft for instruction.

Your insurance also will not normally cover damage caused by and confined to wear and tear (including damage to tires, except when caused by fire, theft or vandalism), any personal property left in the airplane, commercial activities, seizure or destruction of the aircraft as a result of war or warlike activity, whether declared or not, or governmental action. That means if your airplane is, rightly or wrongly, seized by authorities abroad (even if you are covered for flight to, from and in that country), you might not be able to recover for your airplane.

This is by no means an all-inclusive list of exclusions; it is merely presented to indicate some of the more common ones. Besides, exclusions are not the only items of concern in the fine print: Look also for implied exclusions in sections containing *endorsements, definitions, conditions or limits of the company's liability.*

Remember, too, that insurance pays for damage resulting from an accident; it may not pay for damage that was the cause of an accident. A broken crankshaft, for example, may not be covered by hull insurance, though subsequent damage to the engine (and airframe, if it is damaged in a subsequent forced landing) would be. Under some policies, the entire engine may be regarded as the failed part; in such a case only the damage incurred in the forced landing would be covered. (This may seem unscrupulous, but it is known to happen: *caveat emptor.*) Even if damage to the engine is covered by your policy, you will only recoup the full value of a new engine if your engine was new. If repairing the damage requires an overhaul and your engine is halfway through its time

States requiring liability insurance on noncommercial aircraft:

California—(for any accident in which injuries or damages exceed \$400) bodily injury: \$50,000 per person, \$100,000 per occurrence; property damage: \$50,000
Maryland—bodily injury: \$50,000 per person, \$100,000 per occurrence; property damage: \$50,000
Minnesota—bodily injury: \$25,000 per person, \$50,000 per occurrence; property damage: \$25,000
South Carolina—bodily injury: \$100,000; property damage: \$100,000
Virginia—bodily injury: \$50,000 per person, \$100,000 per occurrence; property damage: \$25,000; single limit: \$250,000

between overhauls, you will only be paid half the cost of an overhaul. You will never come out of an insurance settlement with more than you had when you filed the claim.

Besides the exclusions listed in your aircraft policy, be sure that your personal life or disability insurance does not contain an exclusion for flying. Some policies do, particularly corporate group policies; others require an additional premium from pilots. Many companies, however, will accept the risk at no additional charge if you have safely accumulated a reasonable amount of flying experience. (For more information on such policies available to AOPA members, consult the AOPA Service Corporation [ASCO]: 301/695-2101).

What constitutes a "reasonable" amount of experience is at the discretion of the underwriter. Similarly, insurance premiums are calculated according to a complex formula. The premiums you pay in exchange for the aviation under-

writer's assuming your risk will depend on a large number of factors, the three most important of which are your qualifications and experience as a pilot (and the qualifications and experience of any other pilots who will fly the airplane), the value of the aircraft and its ease of repair, and the sort of operations you intend to conduct in the aircraft. A low-time private pilot with no ratings who buys a high-performance aircraft that he intends to lease back to an FBO for instruction will be paying hefty premiums. In contrast, an instrument-rated pilot with many hours of experience and time in type who buys the same airplane for personal use will face much lower payments. You will be asked questions such as: Will charges be made for use of the aircraft? (Not even gas money is allowable in many cases.) Will it be used for carrying anything other than people? Will it operate from anything other than paved runways? Will it be used outside the U.S.? Will it be used for instruction? Do you own any other airplanes? You will probably also be asked if you have had any accidents; FAR violations; pilot or medical certification limitations; physical impairments; felony convictions, arrests or license suspensions for motor vehicle offenses, or citations for reckless operation or operation of a motor vehicle while under the influence of drugs or alcohol. Any affirmative answers will have to be explained in detail.

Even though you may name other pilots on your policy, find out what distinction the underwriter makes between a *named pilot* and a *named insured*. The former may not be fully protected under the policy; the latter is. It may take a *waiver of subrogation* (subrogation is the acquisition by the underwriter of your rights against third parties for the purpose of indemnification of loss to the extent that the underwriter pays the loss) to make sure that pilots other than the owner are personally covered by the policy. Named pilots are normally covered by the liability insurance but not necessarily by the hull insurance. While the aircraft owner might be paid for damages incurred by a named pilot, the underwriter could then sue the named pilot for recovery. (For renter-pilots, the same generally holds true of aircraft owned by an FBO, hence the importance of insurance disclosure statements for rental aircraft.)

Premiums will also be based on the aircraft, including its age, make and model, number and power of engines,

number of seats, type of landing gear and value. Homebuilts, antique or classic aircraft, helicopters, and aerobatic and ex-military aircraft may be expensive to insure, and not all underwriters will handle them. Balloons and sailplanes have their own special requirements. But unremarkable taildraggers and floatplanes, seaplanes and amphibians may also face higher premiums than plain-vanilla tricycle-gear aircraft. Even the number and type of instrument approaches available at your home field can make a difference.

Your premium will reflect how many exclusions you want removed from your policy, how many other pilots will be

named on your policy and whether you are buying through a broker, whose fee (generally 10 to 15 percent of the total annual premium) is added to your premium. Your premium may be reduced by building accident-free hours (particularly in night and cross-country flight), improving your proficiency and ratings (particularly in attaining the instrument rating), storing your aircraft in a secure hangar at a well-equipped airport and in other ways demonstrating a reduced exposure to risk.

The number and relative weight of the factors that determine your premiums vary within and among underwriters. It is therefore impossible to estimate

in an article of this type what a specific premium for a given aircraft flown by a given pilot for a given type of mission might be. When buying insurance, do not start by shopping around for the best price. First, determine precisely how much and what kind of coverage you need to adequately protect yourself, then compare policies for the best value for your insurance dollar. Establishing a good relationship with a reputable broker is well worth the few extra dollars his or her services might cost and might save you some money, and a lot of heartache, in the long run. Only a very few, very rich people can afford to be self-insured. □

PAYING FOR THE PIPER

... or the Cessna, or the Beech, or ...

BY J. JEFFERSON MILLER

For anyone who has bought a house or even an expensive car, the financing process should hold no mysteries. Airplane loans, however, are not as common as home and auto loans, and most bankers have limited experience in financing aircraft purchases. Some are reluctant to make aircraft loans. Bankers often are uncertain of the actual value of an aircraft. Also, they may not know how to handle paperwork details, such as securing the airplane as collateral by placing a lien on it. (The lien enables a bank to recover its investment should an aircraft purchaser default on a loan.) It is altogether easier for a banker to make another home loan than it is for him to study up on aviation for a few pilot customers. On the other hand, if you are a valued client at a local bank, and if your banker has a good understanding of your financial status, you may have no trouble obtaining an aircraft loan on reasonable terms.

Many aircraft purchasers turn to lending institutions that specialize in aircraft financing. A list of National Aircraft Finance Association (NAFA) lenders is available from AOPA's membership services department. Lenders fall into two categories—commercial banks and finance companies. Commercial banks take in deposits and make loans. Finance companies obtain their working capital from other sources, such as parent corporations. The Big Three general aviation manufacturers (Beech, Cessna

and Piper) have operated "captive" finance companies in order to help dealers and retail customers finance purchases. In earlier years, these financing services were offered primarily for the purchase of new aircraft. With the decline of the new airplane market, however, Cessna Finance Corporation has become heavily involved in the financing of used aircraft purchases. Piper has recently turned over its financial services to the Chase Aircraft Finance Company, which also makes loans for used airplanes. The two types of lending institutions generally offer competitive rates within a given region of the country, according to NAFA president J. Byron Edwards.

The loan officers at both types of lending institutions often are pilots and usually are quite knowledgeable about the different types of general aviation aircraft, their upkeep costs and their resale values. It is a loan officer's job to evaluate your financial status and the financial practicality of the aircraft purchase you intend to make. Simply put, he is the one who will give the thumbs up or thumbs down on your loan application. But he also can act as an adviser and may help you make a better purchase. For example, suppose you are considering two different aircraft for purchase. The banker may have an opinion about which aircraft is a better buy in terms of historical resale values. He also may be able to point out any maintenance con-

siderations, such as expensive, recurring airworthiness directives, that would add to your maintenance costs and possibly make it more difficult to sell the airplane at some time in the future.

These aircraft value considerations will also affect the terms of the loan. If the aircraft in question is a Beechcraft A36 Bonanza, for example, a loan officer may be willing to extend the repayment period of a loan from five years to seven or more years. The reasoning behind this decision is that the A36 holds its value very well on the used market. Many other airplanes depreciate quickly, and bankers may quote loan periods of five years or less for certain aircraft. An aircraft also will depreciate more quickly the more it flies. A loan for a flight school trainer, therefore, may run only four years, whereas a loan for a personal or business aircraft that will be flown less than 300 hours a year may be financed over five to seven years.

The condition of an aircraft also affects the terms of a loan. If an aircraft has a nearly run-out engine, a lender may wish to finance less of the purchase cost than if the airplane had a freshly overhauled powerplant. The reason again is depreciation. Should the lender have to repossess the aircraft, it will have a lower resale value with an engine near TBO. Usually, the maximum loan a lender will make on an aircraft is equivalent to 85 percent of the airplane's suggested retail price as found in the *Air-*

craft Bluebook—Price Digest. The balance must be in the form of a down payment.

A loan officer will be interested in the type of aircraft you are buying and its condition for other reasons as well. He might consider it reasonable, for example, to lend you \$200,000 to buy a Beech Bonanza but not to buy an early model Piper Cheyenne. In such a situation, it may be that the loan officer has determined from your financial statement that you can afford the upkeep on the Bonanza but not on the Cheyenne. In other words, the lender will want to know that you can afford not only the aircraft payments, but also all of the related aircraft expenses.

The loan officer, will, of course, be quite interested in your financial status. You will have to provide detailed information on your debts, assets, sources of income, present and former creditors and other pertinent information. Basically, the loan officer simply wants to know whether you can afford the loan and whether you are a good credit risk. Lenders have different ways of determining this. Some are more concerned with your cash flow—that is, how much flows into and out of your pocket every month—while others are “asset lenders” who place more emphasis on your balance sheet.

Lenders are particularly interested in your disposable income: how much you have left after paying for fixed obligations, such as your home loan. One rule of thumb for assessing your ability to carry a loan holds that your total debt payments should not exceed more than a third of your income. Another oft-heard rule of thumb is that you will not be able to obtain a loan for an amount that is greater than your annual income. But lenders are quick to state that these rules often are honored more in the breach than the observance. For example, an individual making \$30,000 a year may be less able to handle a loan equaling his income than an individual making \$100,000 annually because a larger percentage of the latter person's income is likely to be available for discretionary purchases.

An individual with a large income may not receive favorable treatment from a lender, however, if the loan applicant has been in a high-salary position for only a short time. In this situation, the applicant's financial stability may be in question. Lenders like to see indications of steady employment. Of course, if you are unemployed but are

living off of the 50,000 shares of IBM stock that Grandma Elsie left you, you will probably be able to obtain a loan for a personal airplane. So there is really no one formula for determining whether a lender will approve a loan application. Though it may be stating the obvious, if you have done your homework and *know* you can afford to own and operate an airplane (not just make the loan payments), your chances of obtaining a loan are enhanced.

The interest rate you are quoted depends in part on the lender's perception of you as a credit risk. For the very best customers, usually businesses making large investments, it is possible to obtain the prime rate (which is currently at 7.75 percent). For a personal loan you can

AOPA Air Power Loans

AOPA now offers aircraft financing to members through the Maryland National Bank. The Air Power Loan program provides financing in amounts up to \$500,000. There is no minimum loan amount as with other lending institutions. (Some set their minimums as high as \$100,000.) Another unique feature of the Air Power Loan is that payment periods can extend from five to 15 years. Typically, lenders set payment periods at between five and seven years. Members can choose either a fixed interest rate at 3.25 percent above prime or a variable rate at 1.5 percent above prime. Qualified applicants can obtain a “pre-approved” loan through the program.

Air Power Loans are available to aircraft owners for refurbishment projects, repairs or overhauls. Owners may also refinance existing loans. Aircraft purchasers who obtain an Air Power Loan also can obtain an AOPA “Reserve” account, an unsecured line of credit for up to 10 percent of the aircraft's purchase price or \$10,000. This line of credit can be used like a credit card for paying various aircraft maintenance and upgrade expenses.

The Air Power Loan program includes an FAA title search and filing fee payment at no cost to the member. Members who obtain loans for more than \$20,000 will receive their AOPA membership free for the entire length of the loan.

More than 500 members have already received Air Power Loans. The average loan has been approximately \$30,000. AOPA also has announced its Flight Fund line of credit, which may be used to finance flight training. The line of credit is available in amounts from \$2,500 to \$5,000. For more information on Air Power Loans telephone 800/543-3559; in Maryland, call 800/423-7800. For information on the Flight Fund program, telephone 800/847-7378.

—JIM

expect rates that range from one percent to 2.5 percent above prime for floating-interest loans and from 1.25 to 3.5 percent above prime for fixed-interest loans. A fixed-rate loan sets the interest rate for the entire term of the loan. A floating-rate (also known as an adjustable-rate or variable-rate) climbs or falls as the prime rate goes up or down. Floating rates are popular now because interest rates are lower than they have been for several years. If interest rates should rise several points, the person who takes out a fixed-rate loan now may end up spending less money on the interest on his loan than the individual who took out a floating-rate loan.

Some lenders will provide a “pre-approved” loan that will enable you to close a deal on a used airplane quickly once you have found the airplane that you want. The pre-approved loan may also help you negotiate a lower price for the airplane because you will be able to bargain with cash in hand. To obtain this sort of commitment from a lender, however, you will have to have a clear idea of the type of airplane you intend to buy and how much you intend to spend.

Experienced aviation lenders are aware that the purchase price of a used airplane may be only the initial investment in the aircraft. They therefore may be willing to establish a line of credit for you that will enable you to upgrade the airplane with new avionics, new paint, a new interior and a new engine or engines.

Another financing method that may be worth exploring is the second mortgage. With the latest revisions of the tax code, this technique is becoming increasingly popular. The new “simplified” tax code gradually phases out the tax deduction for consumer interest (including the interest on your airplane loan if it is used solely for personal travel) but retains the full deduction for home loans. Therefore, if you have sufficient equity in your home to qualify for a second mortgage, you can use this money for any purchase and still deduct the interest on the mortgage. The new tax code also retains the deduction for interest paid on business loans.

Proof of insurance is required by the lending institution at the time you close the deal on an airplane purchase, so you will want to be talking to an insurance broker at the same time you are applying for a loan. The lender probably will require “breach of warranty” coverage in the insurance policy. This provision

will ensure that the lender receives the balance of a loan from your insurance company in the event of an accident, even if the terms of your policy were violated.

As with other major investments, it pays to get expert advice before signing any papers. An accountant's dispassionate view can help you make sound financing decisions. His blessing on the proposed transaction is often welcome reassurance that all of the tax angles have been carefully evaluated and that the purchase of an aircraft will not lead you into penury. □



PAPERWORK

Lining up the proper documents for your new airplane can be a formidable task. Fortunately, AOPA can help.

BY MARK M. LACAGNINA

Legend suggests that there was a time when a handshake was enough to complete a transaction, but the days when a man's word was his bond—if those days ever really existed—have passed. Today's world is tightly regulated by paperwork and bureaucrats. A person entering into a relatively minor transaction, such as buying a used car, may find himself being asked to sign one document just to attest that he has, indeed, signed another.

As you might expect, the purchase of a used airplane involves long and tangled streams of red tape, many of which are tied to Federal Aviation Regulations. Securing and processing the proper forms you need to operate a new airplane according to federal and local regulations can be a confusing and tedious task if you choose to tackle it all by yourself, but, as we shall see, AOPA can provide a considerable amount of assistance in lining up the proper documents. First, let's untangle some of the red tape and see what we are up against.

We'll start on familiar ground, with the mnemonic ARROW. The letters stand for the documents that must be carried aboard an airplane. They are: an airworthiness certificate, registration certificate, radio station license, operating limitations and weight and balance information.

A current airworthiness certificate is required (by FAR 91.27) to be displayed in an airplane where it can be read by

everyone aboard. An airworthiness certificate usually is transferred with an airplane when it is sold, but the certificate alone does not fulfill the regulatory requirement. A buyer must ensure that the airworthiness certificate is, as the regulation specifies, *current*. Don't look for a specific expiration date on the document; there is none. A Standard Airworthiness Certificate (FAA Form 8100-2) remains current as long as the airplane is maintained according to regulations and is properly registered, according to the FAA.

Aircraft owners are required to keep records of all inspections and maintenance required by regulations, as well as any major repairs and alterations. Before purchasing an airplane, you should study the airplane's engine and airframe logbooks to determine if the maintenance and record-keeping requirements have been fulfilled. Check for the following information: the total time in service of the airframe, engine(s) and propeller(s); current status of any life-limited parts; time since overhaul of any component that is required to be overhauled at specific intervals; status of compliance with required inspections; status of compliance with applicable airworthiness directives, and copies of descriptions of major repairs and alterations (FAA Form 337s) that have been performed on the airplane.

An airplane used solely for personal transportation, business or pleasure fly-

ing must be inspected at least once each year. Inspections every 100 hours are required for airplanes hired either to carry passengers or for flight instruction. Jets, turboprops and large airplanes (those weighing more than 12,500 pounds) must be inspected according to a program approved by the FAA.

The FARs also include inspection requirements for specific equipment. For example, if the airplane has a transponder, you should check the logbooks to ensure that the unit was tested within the past 24 calendar months (as required by FAR 91.172). If an airplane is operated under instrument flight rules, its static system, altimeters and altitude-reporting equipment also must have been inspected during the past two years (FAR 91.171).

Logbook entries must include descriptions of the work that was performed on the airplane, the date the work was completed and the signature and FAA certificate number of the person who approved the airplane for further flight. Of course, a mechanic also has the authority to *disapprove* an airplane for return to service after he has completed a required inspection. In this case, the logbook entry would include his reasons for determining that the airplane is not airworthy.

If you buy an airplane that did not pass a required inspection, you will have to have the appropriate repairs performed and signed off before you can fly

the airplane. The FAA may approve a ferry permit so that you can fly the airplane to another airport where the work can be performed. You can apply for the Special Flight Permit (FAA Form 8130-6) at a General Aviation District Office (GADO) or Flight Standards District Office (FSDO). The FAA may issue the permit after a mechanic inspects the airplane and determines that, although it does not meet all airworthiness standards, it is in suitable condition to make the *one* flight you have requested.

Airworthiness directives (ADs) are, literally, federal aviation regulations. An airplane may not be operated unless *all* applicable ADs have been complied with (FAR 39.3). Therefore, it is very important, when reviewing an airplane's maintenance records, to check for evidence of compliance with all applicable ADs. Inspection, repair and operational recommendations are published by manufacturers in the form of service bulletins. Unless a service bulletin is specifically mentioned in an AD, compliance is not required. However, you should review all applicable service bulletins. If the person from whom you are buying the airplane does not have them, you can purchase them from the manufacturer. A review of service letters may disclose some recommendations you consider essential, and the airplane's maintenance records will show if the work has been performed.

To digress briefly from the subject of *required* documents, it is worthwhile to note the benefits of studying other sources of information on potential maintenance and operational problems while you are completing the prescribed paperwork. One source is Service Difficulty Reports. They are compiled from Malfunction and Defect Reports (FAA Form 8010-4s) submitted by mechanics, aircraft owners and pilots. Sometimes these reports are grounds for issuance of an AD; however, most are not considered by the FAA to justify regulatory action. Nevertheless, the reports are useful in pointing out potentially serious maintenance problem areas that have been detected by others who have flown or worked on airplanes similar to the one you may buy.

If you employ a bit of Holmesian deduction, the airplane's maintenance records may reveal damage history that the owner may not have mentioned. You won't find any tattletale descriptions such as "Airplane landed gear-up, 3/13/87," but you may find such clues

as "Fuselage belly skin replaced, 3/14/87." Be skeptical.

One final tip while we're off the subject: To help you evaluate the condition of an airplane, you should consider contracting a mechanic who knows the airplane and its systems to perform a *prepurchase inspection*. A recent annual inspection will indicate only that, in the opinion of the person who signed the logbook, the airplane will remain airworthy for at least one more year. A mechanic who performs a prepurchase inspection, on the other hand, may tell you, for example, that a critical component probably will have to be replaced within the next three years.

As mentioned earlier, an airplane must be properly registered to maintain a current airworthiness certificate. You can re-register an airplane in your own name (and your co-owners' names, if there are any) by sending an Aircraft Registration Application (AC Form 8050-1), evidence of ownership and a recording fee to the FAA Aircraft Registry, AAC-250, Post Office Box 25504, Oklahoma City, Oklahoma 73125. Evidence of ownership can either be an Aircraft Bill of Sale (AC Form 8050-2) or a conditional sales contract. The recording fee is \$5 if you submit a bill of sale, \$10 if you send a conditional sales contract.

After completing the registration application, mail the white and green copies to the FAA and keep the pink copy as evidence of your application. It will serve as temporary authorization to fly your airplane until the FAA mails you a Certificate of Aircraft Registration. The certificate is valid until the airplane is sold again, registered in another country, destroyed or scrapped, or until its owner dies. (Several states have their own registration requirements. See "State Registries," page 82.)

You can count on extra paperwork

For further reading from *AOPA Pilot*:

"Pilot Advisory: What is a mandatory service bulletin?" March 1986, p. 121.

"Minimum Equipment Lists," March 1986, p. 46.

"Pilot Counsel," October 1985, p. 16.

"Defective Directives," August 1985, p. 55.

"Pilot Advisory: Annual rites," July 1985, p. 74.

"Pilot Advisory: Airworthiness directives, service bulletins and service difficulty reports," March 1985,

p. 114. □

and an additional \$10 fee if you want to change the airplane's registration number. You can list five different N numbers (actually, either one to four numbers with a suffix letter or one to three numbers with two suffix letters, following the United States designation "N"), in order of preference, in a written request forwarded with your registration application. The FAA will let you know which of the five numbers is being reserved for your airplane. *But*, before you paint the new number on your airplane, you have to send another written request to the FAA. The agency will send you another document (AC Form 8050-64), giving permission to change the number. After doing so, you must sign and return one copy of the form to the FAA and present the other copy, as well as the airplane's airworthiness certificate, to an FAA inspector, who will issue a new airworthiness certificate showing the new number.

Another document that must be renewed when an airplane changes hands is the Aircraft Radio Station License. This can be accomplished by mailing an application (FCC Form 404) to the Federal Communications Commission, Post Office Box 1030, Gettysburg, Pennsylvania 17325. There is a separate form (404A) attached to the application that you should keep; it will provide temporary authorization to operate the airplane's radios while the application is being processed. Then, when the new license arrives, send the old one back to FCC at the above address.

The final documents—operating limitations and weight and balance data—for relatively new airplanes usually can be found in the approved pilot operating handbook (POH). The information for older airplanes may be found on separate documents. You should check to see that all applicable placards listed in the limitations section of the POH are installed in the airplane. Too, the weight and balance data should be up to date and accompanied by a current equipment list.

If you are buying a multi-engine airplane, there is one other document you should look for: a minimum equipment list (MEL). Regulations governing operations under the provisions of an MEL were adopted last year (FAR 91.30). Of importance here is that if you buy an airplane that has an approved MEL (a MEL is *not* a required document) and move it to a base that is outside the jurisdiction of the FSDO that handled the

paperwork for the MEL, you will have to make arrangements to transfer the paperwork to the FSDO that has jurisdiction over the airplane's new base of operations. That FSDO will issue a new letter of authorization. (An MEL and a letter of authorization from the FAA to operate an airplane under the provisions of the MEL constitute a supplemental type certificate and must be carried aboard the airplane.)

Now that I may have given you the impression that the paperwork will

overgross your new airplane and tie up your spare time for the next few months, let me repeat the good news: AOPA can help. For a fee, the association will provide a wide variety of services, including title and lien searches and compilations of damage reports, service difficulty reports, accident/incident reports and airworthiness directives. In addition, the association will process several of the required documents for you.

A package of materials that thoroughly describes these services and the

paperwork requirements (copies of the actual documents are included) is available from AOPA. A request for the "Aircraft Purchaser's Package" and \$5 to cover postage and handling can be sent to: AOPA Membership Services Department, 421 Aviation Way, Frederick, Maryland 21701. □

STATE REGISTRIES

The following states require aircraft registration. For more information, contact the state agencies listed.

ARIZONA: Registration fee, \$5; Division of Aeronautics, 1801 West Jefferson, Room 426, Phoenix, Arizona 85007; 602/255-7691.

COLORADO: Annual registration fee for aircraft weighing less than 3,000 lb, \$5 per 500 lb or portion thereof; 3,000 to 5,999 lb, \$8 per 500 lb; 6,000 to 12,499 lb, \$20 per 500 lb; Aviation Planning Staff of the Division of Local Government, 1313 Sherman Street, Number 520, Denver, Colorado 80203; 303/866-3004.

CONNECTICUT: Aircraft registration required, no fee; Bureau of Aeronautics—Department of Transportation, 24 Wolcott Hill Road, Wethersfield, Connecticut 06109-0801; 203/566-4417.

HAWAII: Registration fee, \$10; General Aviation, Department of Transportation, Honolulu International Airport, Honolulu, Hawaii 96819; 808/836-6432.

IDAHO: Registration fee based on useful load of aircraft, \$.025 per lb; Bureau of Aeronautics and Public Transportation, 3483 Rickenbacker Street, Boise, Idaho 83705; 208/334-3183.

ILLINOIS: Registration fee, \$10; Division of Aeronautics, Department of Transportation, Capital Airport, 1 Langhorne Bond Drive, Springfield, Illinois 62707-8415; 217/785-8515.

INDIANA: Annual registration fee, \$10; Division of Aeronautics, Department of Transportation, 143 West Market Street, Suite 300, Indianapolis, Indiana 46204; 317/232-1470.

IOWA: First-year registration fee, 1.5 percent of list price; second year, 75 percent of first-year fee; third year, 50 percent of first-year fee; fourth year and thereafter, 25 percent of first-year fee; Air and Transport Division, Department of Transportation, State House, Des Moines, Iowa 50319; 515/281-4280.

LOUISIANA: Registration fee, \$50 for two years; Office of Aviation and Public Transportation, Department of Transportation and Development, Post Office Box 94245, Baton Rouge, Louisiana 70804-9245; 504/379-1235.

MAINE: Registration fee, \$10; Division of Aeronautics, Department of Transportation, Augusta State Airport, Augusta, Maine 04333; 207/289-3185.

MASSACHUSETTS: Registration fee based on maximum gross weight of aircraft; 0 to 2,000 lb, \$48; 2,001 to 3,500 lb, \$76; 3,501 to 12,500 lb, \$112; Aeronautics Commission, 10 Park Plaza, Boston, Massachusetts 02116; 617/973-7350.

MICHIGAN: Registration fee based on net empty weight of aircraft, \$.005 per lb; Licensing, Safety and Education, Aeronautics Commission, Department of Transportation, Capital City Airport, Lansing, Michigan 48906; 517/373-1834.

MINNESOTA: Registration fee, \$10; Aeronautics Division, Department of Transportation, Transportation Building, St. Paul, Minnesota 55155; 612/296-8202.

MISSISSIPPI: Registration fee based on weight and type of aircraft; base weight fee, \$20 to \$1,500; type, single-engine, 1 x base fee; multi-engine, 2 x base fee; rotary wing, 3 x base fee; turbo, 6 x base fee; turbojet, 10 x base fee; Aeronautics Commission, Post Office Box 5, 1701 Walter Sillers Building, Jackson, Mississippi 39205; 601/359-1270.

MONTANA: Registration fee, \$5; Aeronautics Division, Department of Commerce, Post Office Box 5178, Helena, Montana 59604; 406/444-2506.

NEW HAMPSHIRE: Registration fee, \$30, resident; \$45, nonresident; Aeronautics Division, Department of Transportation, Municipal Airport, Concord, New Hampshire 03301; 603/271-2551.

NEW MEXICO: Registration fee based on gross weight and age of aircraft, \$.01 to \$.02 per lb; Aviation Division, Department of Transportation, Post Office Box 579, Santa Fe, New Mexico 87504-0579; 505/827-0332.

NORTH DAKOTA: Registration fee based on year of manufacture and maximum takeoff weight of aircraft, \$8+; Aeronautics Commission, Bismarck Airport, Box 5020, Bismarck, North Dakota 58502; 701/224-2748.

OHIO: Registration fee based on aircraft seats; from \$6 for one or two seats to \$15 for five seats; each additional seat, \$5; Bureau of Aviation, 2829 West Granville Road, Worthington, Ohio 43085; 614/466-7120.

OKLAHOMA: Registration fee based on type, gross weight and age of aircraft, \$10+; Aeronautics Commission, Department of Transportation Building, 200 Northeast 21 Street, Room B-7, First Floor, Oklahoma City, Oklahoma 73105; 405/521-2377.

OREGON: Registration fee based on type and age of aircraft, \$20 to \$190; Aeronautics Division, Department of Transportation, 3040 25th Street, Southeast, Salem, Oregon 97310; 503/378-4880.

RHODE ISLAND: Registration fee based on weight, \$30 to \$60; Division of Airports, Theodore F. Green State Airport, Warwick, Rhode Island 02886; 401/737-4000.

SOUTH CAROLINA: Registration fee based on type and takeoff weight; single-engine, \$5; twin-engine under 6,000 lb, \$10; over 6,000 lb, \$20; Certificate of Insurance required before registration; Aeronautics Commission, Columbia Metropolitan Airport, Drawer

1987, Columbia, South Carolina 29202; 803/734-1700.

SOUTH DAKOTA: Registration fee based on age and gross takeoff weight of aircraft, \$10 to \$100; Department of Transportation Services, 700 Broadway East, Pierre, South Dakota 57501-2585; 605/773-3574.

UTAH: Registration fee, \$25 plus one percent of blue book value; Aeronautical Operations Division, Department of Transportation, 135 North 2400 West, Salt Lake City, Utah 84116; 801/328-2066.

VIRGINIA: Registration fee, \$5; Department of Aviation, Post Office Box 7716, 4508 South

Laburnum Avenue, Richmond, Virginia 23231; 804/786-1364.

WASHINGTON: Registration fee based on type of aircraft, \$20 to \$125, and \$5 filing fee; Division of Aeronautics, Department of Transportation, Boeing Field, 8600 Perimeter Road, Seattle, Washington 98108; 206/764-4131.

WISCONSIN: Registration fee based on gross weight, \$30 to \$3,125; Bureau of Aeronautics, Department of Transportation, 4802 Sheboygan Avenue, Post Office Box 7914, Madison, Wisconsin 53707; 608/266-3351.

—compiled by Julie A. Weinrich