TRAINING WINGS

WHAT DO YOU BUY TO LEARN TO FLY?

From where, oh where, will the new trainers come?

BY THOMAS B. HAINES

Ask a dozen flight school managers to sketch the ultimate training aircraft, and you won't get descriptions of some exotic flying machine stuffed full of new technology. The manager probably will describe whatever aircraft he is using. Sure, he might offer a few refinements to his trusty Cessna 152 or stalwart Piper Warrior—quieter cabins, more comfortable seats, better ventilation—but all in all, most flight schools are happy with the choices they've made in trainers over the past 20 years. The problem is finding replacements as the fleet ages.

Probably no one watches the used aircraft market more closely than managers at university flight schools, accelerated schools, and local fixed-base operation flight schools. Flight time is their product, and without training aircraft, they are out of business. A decade ago, the managers regularly replaced their fleets with new trainers and easily sold the used aircraft. Today, none of the traditional trainers—the 152s, 172s, Tomahawks, and Warriors—are being built. The schools must continue to buy the increasingly rare low-time used trainers, or they must evaluate new aircraft. Of the new single-engine aircraft for sale today, none were specifically designed as trainers. The Aerospatiale General Aviation Tampico, which has been making inroads in the training market, is the closest airplane to a purpose-built trainer.

The 160-horsepower Tampico, with its fixed-pitch prop, shares its airframe with the more powerful Tobago and retractable-gear Trinidad. The Tampico features a more austere interior and fewer standard features than its stablemates. Among the Tampico's endearing features for flight schools are a wide cockpit with good visibility and two doors for easy entry and exit. Also, the Tampico is a four-seater—another plus for schools that put observer-students in the rear seats. One school manager evaluating the Tampico said he liked the fact that flaps are recommended for takeoff, the airplane comes with a row of annunciator lights, and trim and power controls are mounted on a center pedestal—all things students will find in the larger aircraft they will fly later.

Of particular importance to FBO flight schools is the fact that the Tampico is part of a family of aircraft. Like they did with the Cessna 100 series and the Piper Cherokee series, FBOs operating Aerospatiales can hope to move students up to higher performance aircraft and perhaps turn the students into aircraft owners. Once checking out in the Tampico, the pilot could move up to the Tobago and eventually to the complex Trinidad and turbocharged Trinidad TC.

The other big contender today in the primary training market is the Tiger from American General Aircraft Corporation. The AGAC Tiger is basically the same aircraft built by Grumman in the late 1970s but with a few refinements—including more durable materials in the nose cowling, dorsal fin, and wheelpants. The new airplanes feature four-point harnesses, a 28-volt electrical system (instead of 12 volts), and other minor improvements. The Tiger, with its 180-hp engine, sleek canopy, and narrow cabin, was built for speed—not a requirement for a trainer. Even with 20 more horsepower than the Tampico, the

Aerospatiale TB–9 Tampico

small Tiger can about match the fuel economy of the bigger French airplane by simply flying at lower power settings.

The Tiger's most unusual characteristic is its springy, castoring nose gear, which can be more challenging to control during taxi than the Tampico's more conventional steerable nose gear. Schools using the Tiger, though, report few problems.

Mooney Aircraft, too, has taken an airplane that originally wasn't meant to be a trainer and turned it into one.


American General AG–5B Tiger

The Mooney ATS, for "Advanced Trainer," is a specially equipped version of the M20J featuring a more durable interior and basic IFR avionics. Mooney has sold the ATS to schools seeking complex trainers.

Adapting a personal airplane for a training role is not a new concept. Stripped-down 172s have served as trainers for years. Before suffering its recent financial stresses, Piper took hundreds of orders for its Cadet, a Warrior specially equipped for the training market. But almost always in the past, there was the option of buying a purpose-built trainer—a 150 or 152, Tomahawk, or Beech Skipper.

There is, then, no lack of manufacturers willing to build airplanes that can be used as trainers, but there is a hesitancy on the part of flight schools to purchase new airplanes. Part of the reason is a lack of experience with today's manufacturers. The schools have had longstanding relationships with Piper and Cessna but little experience with Mooney, and even less with Aerospatiale and AGAC. Still, probably the biggest obstacle to new sales is cost. Flight schools considering a fleet purchase can expect to pay nearly $90,000 for a VFR Tiger; or about $80,000 for a Tampico. IFR equipment adds at least $15,000 to the prices. An ATS with its IFR panel will cost more than $152,000. The prices vary based on the number of aircraft ordered.

The MXT–7 Trigear Maule sells for about $80,000 and the tricycle-gear Taylorcraft F22A for $65,900. Both aircraft are tricycle-gear versions of conventional-gear airplanes, and both are at least partly tube-and-fabric airplanes. Few flight schools have shown much interest in the pair as primary trainers.

For the past couple of years, flight schools have had practically no options when it comes to primary trainers. They had to purchase used equipment or refurbish what they had because no one was seriously marketing new trainers. Aerospatiale only recently began heavily promoting the Tampico in this country, and AGAC has been in business less than two years. Flight school managers are suffering from sticker shock and just now are waking up to the fact that, if they want new primary trainers of modern design, they are going to have to pay about $100,000. Bill Monroe, vice president of sales and marketing at Aerospatiale, blames Piper Aircraft for misleading the flight schools. As recently as 1989, Piper offered and delivered Cadets for as low as $60,000. The company took hundreds of orders and promptly went broke, partly because it couldn't afford to deliver them at those costs. "Piper perpetuated the myth that you can buy aircraft today for less than $100,000. It's inconceivable today that you can build aircraft to today's safety standards for less than that. Once people realize that it's a myth, they take the time to do their own analysis, and they find that $100,000 isn't unreasonable . . . . We're competing against a ghost. Now flight schools are unsure what to do."

Some schools, though, have already begun replenishing their fleets with new units. Florida Institute of Technology, School of Aeronautics, in Melbourne, for example, recently purchased 15 new Tigers. Overall, FIT's fleet of 52 aircraft is one of the younger among those at large university flight schools. FIT took delivery of 15 Cadets in 1989 and had an order for 15 more in 1990, but none of the latter were delivered before Piper ran into financial problems and suspended production, according to Edward Everette, dean of the school. Of FIT's eight Warriors, several have as many as 8,000 hours on the airframe. Some of its four Piper Seminole multiengine trainers have as many as 3,500 hours.

Maule MXT–7-180 Trigear

Unlike FIT, which uses a rear-seat observer-student, Parks College of St. Louis University prefers two-seat trainers. The Cessna 152 is Alan Stolzer's idea of the perfect trainer. He is the chairman of the Aviation Science Department and chief of flight training at Parks. The 152 is easy to fly and maintain, it's economical to operate, and the school knows it can depend on Cessna for support. "If Cessna started building them tomorrow, we'd buy 21 of them." For now, though, he pays between $20,000 and $30,000 for low-time, late-model 152s with no damage history. He has developed a plan that calls for replacement of all 26 of the aircraft in his fleet over the next three years. He's evaluating the Tampico and the Tiger.

Skip Everett, president of Sierra Academy of Aeronautics in Oakland,

Mooney ATS

craft out, the Mooneys will float down to the FBO schools."

While he's not ready to give up, Fred Miller, president of General Aviation Company, a flight school at Fullerton Municipal Airport in California, admits to being "a little discouraged" as he scouts out good used aircraft. He operates four late-model 172s, a Citabria for aerobatic training, and three Tobagos as trainers. He also rents high-performance aircraft. He's not quite as cost conscious as some

California, agrees. "If Cessna would start [production], we'd be first in line. The ultimate trainer is the 150, with the 152 right behind it," he says, citing many of the same reasons as Stolzer. His school operates 17 152s, six 172s and 172RGs, six Beech Duchess twins, four Robinson R22 helicopters, one Bell 206, and one Aerospatiale AStar. "We've been able to get good Cessnas but only after putting in lots of effort and then spending lots on refurbs."

An experimental 180-hp version of the trigear Taylorcraft.

Cessnas are the trainers of choice also at American Flyers. The school, with 12 locations and about 90 aircraft, uses 172s for its primary training. "I've never had a love for Cessnas, but they fit the training mode, and most importantly, the instructors like them and feel comfortable in them," explains Don Harrington, president. He believes in the 172 because the school can fly it 12,000 hours before retiring it. Other aircraft just don't last that long, he says. At a rate of 200 hours per month, it doesn't take long to run through an airframe. He estimates 2,000 172s still in the fleet have fewer than 1,500 hours. Because of the abundance of relatively low-time Skyhawks, he is not worried about availability in the short term. On average, the school replaces its entire fleet over a five-year period.

To Harrington, aircraft cost is not as important as it is to some. He says schools can afford to pay $100,000 for aircraft if they are willing to increase utilization. "If costs double, double utilization. I know I can get utilization up to 300 hours per month if I need to—by flying at night."

Meanwhile, some smaller schools are trying to figure out ways just to survive. According to Aerospatiale's Monroe, "A lot of small flight schools are at a crossroad. They have to decide to either get in or get out. We see lots of interest from them, but many others are reconsidering and may be getting out. They're not debating which model, but whether it's any new aircraft at all and whether to stay in business at all. We'll probably see a consolidation."

Mooney has had little success selling its ATS complex trainer to smaller FBO operations, according to Tim Mott, fleet sales manager. "It's tough to get into FBO schools because of the cost. As [larger] schools rotate the aircraft out, the Mooneys will float down to the FBO schools because he says his customers are willing to pay a little more for clean, well-maintained trainers. Nonetheless, those aircraft are getting harder to find at any price, he reports.

Like Miller, Mike Langston, marketing manager for the Cessna Pilot Center at Yingling Aircraft in Wichita, is shopping for low-time Cessna trainers. His customers, though, are more cost conscious. "We'll probably stay with two-seat aircraft because we can operate them more cheaply." Yingling offers a $2,950 private pilot certificate program. "We've found that, if it gets more expensive than that, we chase people off," Langston says. Yingling will replace its fleet of eight trainers within the next five years. For now, he doesn't believe those airplanes will be Cessnas. As parts for the Cessna fleet become harder to find, he predicts Yingling and others will have to switch to a different make of trainer. Cessna still supplies parts that it makes, but

	Aerospatiale TB–9 Tampico	American General AG–5B Tiger	Maule MXT–7-180 Trigear	Mooney M20J ATS	Taylorcraft F–22A Trigear
Base price:	$78,900	$94,250	$79,995	$152,145	$65,900
Powerplant	Textron Lycoming O-320-D2A, 160 hp @ 2,700 rpm	Textron Lycoming O-360-A4K, 180 hp @ 2,700 rpm	Textron Lycoming O-360-C1F, 180 hp	Textron Lycoming IO-360-A3B6D, 200 hp @ 2,700 rpm	Textron Lycoming O-235-L2C, 118 hp
Seats	4	4	4–5	4	2
Cabin length	8 ft 4 in	7 ft 1 in		9 ft 6 in	7 ft 10 in
Cabin width	4 ft 2 in	3 ft 4 in	3 ft 2 in	3 ft 7 in	3 ft 10 in
Cabin height	3 ft 8 in	3 ft 10 in		3 ft 8 in	3 ft 10 in
Empty weight	1,411 lb	1,398 lb	1,410 lb	1,825 lb	1,040 lb
Gross weight	2,337 lb	2,400 lb	2,500 lb	2,740 lb	1,750 lb
Payload w/full fuel	685 lb	686 lb	670 lb	531 lb	470 lb
Fuel capacity, std	41.7 gal (40.2 gal usable) 250.2 lb (241.2 lb usable)	52.6 gal (51 gal usable) 316 lb (306 lb usable)	70 gal (67 gal usable) 420 lb (402 lb usable)	66.5 gal (64 gal usable) 399 lb (384 lb usable)	42 gal (40 gal usable) 252 lb (240 lb usable)

some parts made by outside vendors are becoming scarce. Fuel gauges, which are not made by Cessna, are especially hard to get, he explains.

Lee Avery, chief flight instructor at Sky Bright, Incorporated, a flight school in Laconia, New Hampshire, says he buys 152s when he can find them at a reasonable price. Like many others in the business, he considers the 152 to be the ultimate trainer—it's easy to fly and maintain, though he wishes for a slightly larger aircraft. Future parts availability is a concern. As a replacement, he is considering the trigear Maule because there is a dealer on the field, and Sky Bright has worked on the aircraft. But, he insists, the price must stay under $100,000.

The concern over parts is not limited to Cessnas. The virtual shutdown of Piper has many operators concerned. Parts availability from Piper was poor all last summer. The company started producing parts again last fall, but the slowdown left schools nervous. "We're extremely concerned about the predicament of Piper. We'll get out of the Piper business if things don't change," explains Ernie Strange, chief flight instructor at Shields Aviation in Jacksonville, Florida. His fleet of Piper Tomahawks and Cessna 152s average 4,500 hours, as do the Warrior IFR trainers. His Arrow complex trainers on average have flown 3,500 hours. In order to make his students as versatile as possible, Shields trains in a combination of high- and low-wing aircraft. Unless Cessna gets back in the business, the 10 new aircraft he plans to buy in the next couple of years may have to be of the low-wing variety.

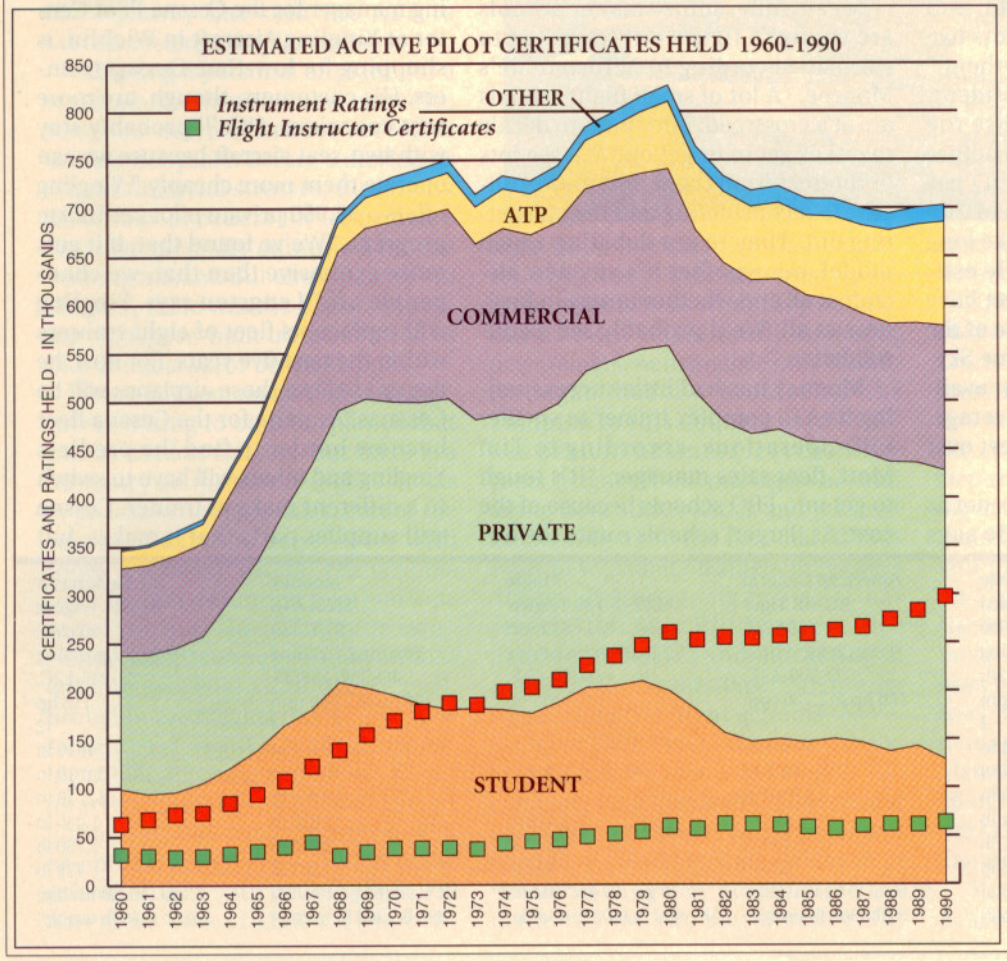
Parts availability is so much of a concern for Paul McDuffee that he is having 12 sets of wings built for his fleet of 172s. McDuffee is chairman of the Flight Technology Department and chief instructor at Embry-Riddle Aeronautical University's Daytona Beach, Florida, campus. ERAU's aircraft experience significant corrosion because of the ocean air. Fatigue, however, has not been a problem, even with the one 172 in the fleet that has more than 11,000 hours. The ERAU fleet averages 6,000 hours.

WHO ARE WE?

We're older and fewer.

The perception most of us have of the student pilot, fresh-faced and wet behind the ears, is false. In general, people who learn to fly are not whimsical kids chasing a dream. They are whimsical adults chasing a dream. And as those of us who have been there know, the ones who stick it out will find the dream well worth the chasing.

According to Federal Aviation Administration statistics, the average age of today's pilot is 40.5 years, up from 37.8 years in 1981. The average student pilot is 32.5, compared to 30.7 a decade ago. This aging trend should not be alarming because it follows almost exactly the aging of the population. A bigger concern might be the declining number of active student pilots each year for almost the past 12 years straight. The FAA considers a pilot or student active if he renews his medical certificate.



Like the pilot population as a whole, the number of student pilots rises and ebbs every decade. The number of student pilots grew through the 1960s from fewer than 100,000 at the beginning of the decade to a high of 209,000 in 1968. The number bottomed out in 1975 at 177,000 and then shot up to 210,000 in 1979. With the exceptions of 1986 and 1989, the number of student pilots has decreased steadily since then. In 1990, the FAA estimated there were 128,660 active student pilots.

The total pilot population has followed a similar trend, except in the past couple of years when the number of pilots has leveled off and actually increased slightly to about 702,650 at the end of 1990. The number of pilots with instrument ratings, meanwhile, has been increasing almost continuously, at least since 1960. —*TBH*

Helping to bring down the fleet average are 19 Cadets. They are the only ones he got out of an order for 150 from Piper.

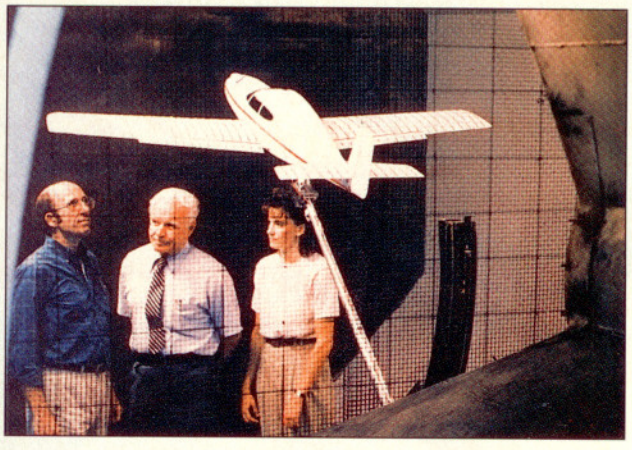
In considering new aircraft, ERAU is looking not only at price, but for a strong relationship with the manufacturer. "We buy a relationship, a partnership. We had it with Cessna and Piper. We look for an opportunity to place students with the manufacturer on an internship basis; we look for a commitment from the manufacturer to support the product. Both Aerospatiale and American General are new players. We'll have to see if they can do that, too."

The manufacturers have a tough job. The schools want a high-quality, dependable product at a reasonable price from a reliable and viable company. The competition is tough, and the biggest competition comes not from the other manufacturers, but from the rugged trainers built a decade or more ago that keep right on flying. □

TRAINER OF TOMORROW

Smith GT–3 Global Trainer

The Piper Tomahawk was to be the answer to every flight school's prayer when it was introduced in 1978—low cost, easy to maintain, conventional in handling, but with enough of a bite in stalls to let the student know it meant business. The characteristics were all things recommended by flight instructors surveyed by Piper. Like most things designed by committee, the Tomahawk turned out to do a lot of things but not many of them well. Maintenance costs were high, particularly because there was little parts commonality with other Piper designs; design and construction problems abounded, leading to costly airworthiness directives; some instructors ended up not liking the handling characteristics; and because of the dissimilarities, some pilots had a difficult time transitioning into larger aircraft.



Noting those problems, why does Michael R. Smith, Ph.D., believe he can succeed in building an aircraft to meet the specific needs of flight schools? The times are different, and so is the technology of today, explains the president of Smith Aircraft Corporation of Bay St. Louis, Mississippi. The Smith GT–3 Global Trainer is being designed with input from the University Aviation Association, the insurance industry, and individual flight instructors. The result, Smith hopes, will be an efficient, economical, and safe trainer for the twenty-first century. The aircraft is designed to accommodate various engine sizes and eventually retractable gear and a constant-speed propeller, to form a complex trainer.

Smith has built a one-sixth-scale wind-tunnel model of the GT–3 (shown) that was tested at NASA's Langley Aeronautical Research Center last May. He is at work on a production prototype of the three-place, fixed-gear, composite trainer. The prototype should be flying by midyear.

He expects to certify the airplane in 1993 and begin deliveries of an aircraft equipped for day VFR flight for between $75,000 and $88,000. A similar aircraft already in production, the Aerospatiale Tampico, sells for about $80,000 with a VFR avionics package.

The GT–3 will have a cabin 50 × 47 inches, about the same width as the Tampico, though the Tampico cabin is only 44 inches high. As in most modern trainers, the student and instructor will sit side-by-side in the GT–3. An observer will sit in a rear, center-mounted seat. Like the Tampico, access to the GT–3 cabin will be through gull-wing doors on each side. Another similarity to the Tampico is the GT–3's 160-horsepower Lycoming O-320 and fixed-pitch propeller. The GT–3's maximum speed will be 155 knots at sea level, according to Smith. Cruise at 75-percent power is estimated at 141 knots and climb rate at 950 feet per minute. At a typical training power setting of 55 percent, the aircraft is projected to cruise at 120 knots while burning less fuel than most four-place trainers. Standard empty weight is estimated at 1,350 pounds. Payload with a full 48 gallons of fuel on board should be 612 pounds. The stall speed is expected to be 50 knots, like the Tampico. A typical training setting for the Tampico is 65-percent power, which yields 101 knots and a fuel burn of 8.9 gph. Its empty weight is 1,411 pounds; with a full 42 gallons of fuel on board, the payload is 685 pounds.

Because of its strength and weight characteristics, Kevlar will be used to construct the GT–3 cockpit. Carbon graphite materials will produce a very strong wing spar with minimum weight. Smith stresses that the careful selection of materials used in the GT–3 allows him to take advantage of the best strength and weight characteristics of each material.

If the GT–3 can do what Smith claims it can, it will be a new, more economical trainer. Engine life should be longer because the GT–3 is projected to perform as well as or better than conventional airplanes, but at a lower power setting. Many questions remain unanswered, however. What special conditions will the FAA put on a composite trainer? Will the low-drag, smooth wings of a composite trainer really deliver the speeds and efficiency claimed? How can Smith certify and deliver a trainer at a projected cost lower than those already certified and in production?

Most of the design work on the GT–3 is complete, and Smith's biggest challenge now is constructing the prototype and rounding up funding for the project. Nonetheless, he believes his careful work and latest technology can make the GT–3 the Cessna 172 of the future. —*TBH*