

GREAT LAKES

LIMITED EDITION

An echo of aviation's past lives.

BY EDWARD G. TRIPP

Wind in the teeth and in the flying wires, tears in the eyes, a chill up the spine (from both the thrill and the drafts)—it is a type of flying that many pilots talk and dream about but few experience in this day and age.

Open-cockpit, biplane flying is accessible, but difficult. It is worth the effort though, even if you only want a brief experience recorded in your memory and in your logbook. For some pilots, it is what flying is all about.

For a long time, the only choices were to build your own or restore a survivor of the 1920s and 1930s or of the endless bumps and grinds of military training flights. Many of the best biplanes were converted to crop dusters, then reconverted to fun airplanes by pilots with commitment, money and time. Then Curtis Pitts certificated a two-seat version of his Special in 1967, followed by a development of his original one-holer, the S-1, and biplanes once again were oozing down a production line.

In 1972, one of the classic, if short-lived, production biplanes, the Great Lakes Sport Trainer, was put back in production in Wichita, just under the noses of Beech, Boeing and Cessna.

The major manufacturers probably never noticed (although quite a few of their engineers and production workers did; it seems many of them moonlight on interesting sport-aircraft projects). There was certainly no need to. The Great Lakes appealed to a totally different area of flying than their more prosaic products.

There are several aircraft that are the embodiment of open-cockpit biplanes, but the Great Lakes is definitely one of the front runners. The original production run was short, but the airplane made a name for itself—and for pilots—many times over. Its fame was extended through the air-show acts of aerobatic performers such as Tex Rankin and Harold Krier. It was very much a factor in the revival of competition aerobatics in the United States; the JocPar Special was a modified Lakes flown by Rod Jocelyn and Lindsay Parsons.

The rip-snorting world of air-show and competition aerobatics usually suggests aircraft that are known for a

PHOTOGRAPHY BY ART DAVIS



lot of things. Ease of flying and gentle characteristics are hardly ever on the list.

In fact, the hairy side of Great Lakes fame misled me the first time I flew one. (The first time I rode in one was from a grass field not far from where they originally were built in Cleveland, Ohio. But back then, I knew absolutely nothing about flying beyond awe and desire.) I was prepared for hair-trigger reactions and the battle between a pilot and a touchy airplane. I was totally wrong. The best way I can portray my reaction to that aircraft was as a large, soft and gentle—and very hon-

est—delight. Even snap rolls seemed free of the neck-twisting sensation associated with those horizontal stalls. The Great Lakes did them in a very gentlemanly manner.

Since then, I have flown four different examples of the second production life of the design. One was the first version, with a 140-hp Lycoming and ailerons on the bottom wing only. The other three are more or less representative of the current production version: 180-hp Lycoming, a constant-speed propeller, inverted fuel and oil systems and four ailerons:

All of them reflect that the original name lives up to



its nature: Sport Trainer. It is an excellent airplane for converting pilots to conventional gear, two wings and open cockpits.

Properly instructed, a prudent pilot will have no difficulty with ground handling, takeoff or landing. Yet all the characteristics of the type are there. Limited visibility is one, particularly forward on the ground and during the flare for landing. Precise directional control and air-speed and rate-of-sink control are required. A much better understanding of the wind and how it affects an airplane on and close to the ground is needed, and you

learn, or relearn, attitude flying and coordinated (or, when conditions require it, uncoordinated) flight. Head-out-of-the cockpit flying together with keen awareness of traffic are essential when operating this type of aircraft.

These are all good things to know no matter what you fly. Doing them right imparts a tremendous sense of satisfaction. Doing them wrong can bring a great deal of embarrassment if not expense.

Preflight preparation is very straightforward. Engine access is good for checking for leaks, fraying bits of anything that might be awry. There are some different things to learn to look for on a tube, wood and fabric airplane, but there are no peculiar tricks or snares.

Starting is as easy as any Skyhawk or Cherokee: The Great Lakes is equipped with a starter and electrical system, including a fuel pump, as standard. It is quite well equipped at its base price—a stiff \$62,995. Basic engine and flight instruments and the inverted oil and fuel systems are standard. Four ailerons are standard now and so is a front cockpit cover. The lighting systems include cockpit, navigation and anticollision. Both cockpits have heaters, and adjustable rudder pedals with heel brakes



are included as standard equipment. The Great Lakes is a sport aerobatic aircraft, but it can be equipped for cross-country flying.

Getting to the starter does introduce some new technique. One cannot stomp or grab just anywhere on such an airplane; and access to the cockpits, particularly the front one, requires the right procedure and a minor amount of athletic ability. If you are flying solo from the rear seat, be certain the safety harness and headset wires in the front cockpit are secure and will not interfere with the controls. Once you settle into the cockpit, the arrangement of switches and controls is logical and easy to learn, although the location of some of the electrical switches on the left side make them hard to reach for the rotund or long of arm. Some care must be taken to avoid inadvertently knocking some of them on or off.

Once the engine is running, the fun and the challenge begin. Someone wrote that visibility over the nose of the Great Lakes is pretty good for a biplane. That person

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When you first see N5Z, you know you are looking at a beautiful biplane. If you know a little something about the Great Lakes, you will spot a few things, aside from the gleaming finish, that did not come from the factory.

This particular Great Lakes is the pride and project of Joseph Zacko, AOPA 88603, who served with the predecessor of the FAA, the Civil Aeronautics Administration, and who recently retired from NTSB as assistant chief of the Field Investigation Division.

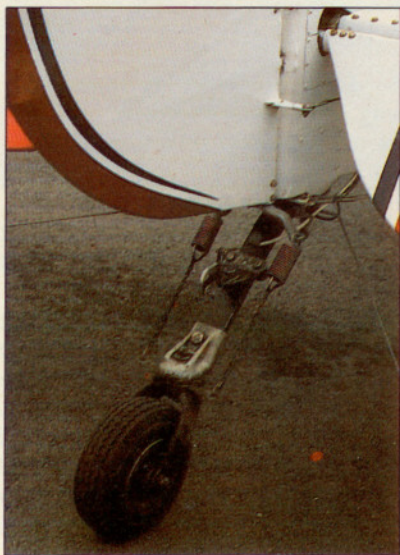
His attention to detail did not begin and end with the finish. The most obvious difference is the well-designed and fitted canopy over the rear cockpit. Less obvious is the larger windscreen on the front cockpit. There is a front cockpit cover that can be fitted, complete with a viewing window so you

can make sure everything is secure without removing the cover.

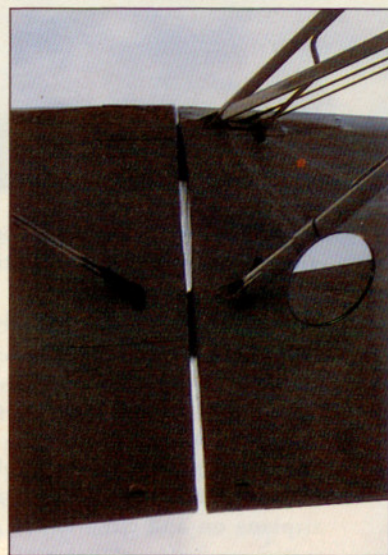
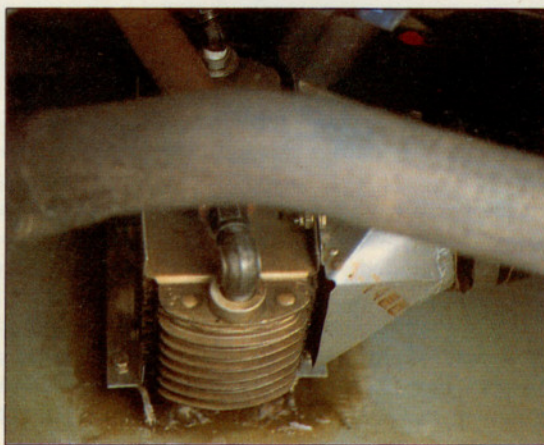
The engine compartment is spit-and-polish, with chrome valve covers and other embellishments. It also includes Zacko's approach to complying with an airworthiness-directive-mandated oil-cooler modification that works better than the FAA's fix. The AD instructs owners to have the oil cooler attached to the cowling, but Zacko's solution was to attach it to the firewall where it does not encounter as much vibration as it would on the cowl. The oil breather tube back at the tailcone has been rerouted to keep the tail and tail-wheel free of gunk.

The wing and fuselage juncture has been faired. The wing walk has been enlarged and is more durable than the original. Other detail refinements have

GOING THE FACTORY



The production Great Lakes is appealing, but there is room for improvement. One of the least satisfactory items is the FAA-mandated oil cooler modification.





Joseph Zacko

been made to the airframe, as well.

The wheelpants have been fitted with small access ports so that the tires can be serviced without having to remove the pants. The rudder stops have been modified to preclude interference between the rudder and elevator at full control deflection.

The front cockpit has been insulated, and every existing crack has been filled to provide more heat in cold weather to

both the front- and rear-seat occupants.

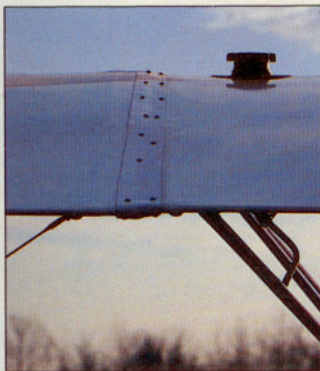
Zacko bought his Great Lakes in 1976. He has rebuilt and restored a variety of aircraft over the years and has helped quite a few others with their projects. He reports that the factory is looking at some of his modifications with the idea of offering them as kits or factory options. The airframe cleanup and the canopy should be popular changes if the factory goes ahead.

I have flown N5Z twice so far, once on the same cold, turbulent day that I flew the other aircraft used for this story (N3565L, which is owned by Steve Chernus, AOPA 676610, of Wormleysburg, Pennsylvania).

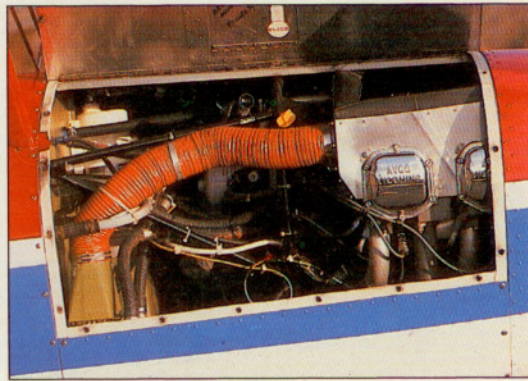
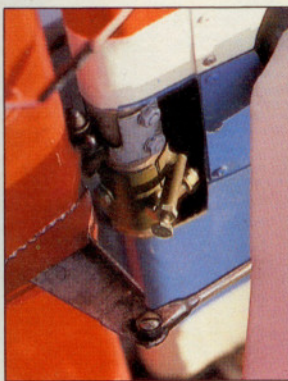
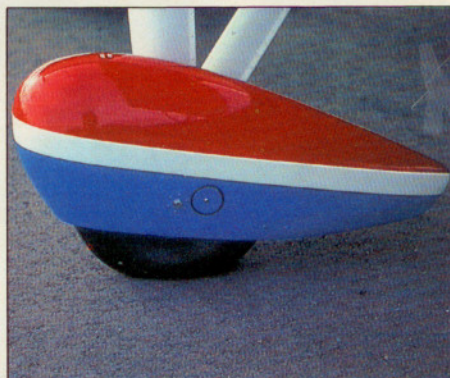
The flights proved that the embellishments add more than just appearance. The engine runs smoother, the noise level is lower even in the open front cockpit, and it is warmer than the factory-standard aircraft. Control response is faster, smoother and lighter.

Zacko's involvement with Great Lakes recently has taken another turn: He has become a distributor for the factory. So if you admire N5Z, Zacko can sell you a new Sport Trainer, and you can horse-trade with him about fitting yours with some of his improvements. □

ONE BETTER



Zacko has refined and polished his Great Lakes everywhere you look. The canopy is a great improvement, particularly in cold weather. Gaps have been sealed (above). The wing walks are of more durable material. The owner's solution to the AD on the oil cooler is better.



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must have been eight-feet tall because there is no visibility over the nose until the tailwheel is lifted during the takeoff run. S-turns are a must, and taxiing must be done at a low forward speed. Collisions on the ground can occur otherwise. Quite a few Great Lakes have ended up on their nose because of sudden brake application.

Tailwheel steering is very effective in the Great Lakes. Short-radius turns on the ground are impressive when the tailwheel swivels free. It takes a bit of practice to get the application of brake, power and the anticipation of when to begin straightening the aircraft out down pat.

The pre-takeoff check is standard and simple. A careful check of the runway for traffic and other hazards must be done before lining up for takeoff and during the turn to final, because the only thing you can see in front of you is the nose of the aircraft.

Rudder quickly becomes effective in the takeoff run. Easing the stick forward so the tailwheel comes up, suddenly opens the runway to view. Soon the aircraft is climbing with just a bit of back pressure. The Great Lakes feels as though it is being pulled skyward on a big, soft cushion. Maximum-rate climbs in high traffic areas are



GREAT LAKES AIRCRAFT COMPANY

2T-1A-2

Base price \$62,995

AOPA Pilot Operations/Equipment

Category: Sport/Special purpose*

Specifications

Powerplant

Avco Lycoming AEIO-360-B1G

180 hp @ 2,700 rpm

Recommended TBO 1,400 hr

Propeller

Hartzell, 2 blade,

constant speed

Wingspan

26 ft 8 in

Length

21 ft 2 in

Height

7 ft 8 in

Wing area

187.6 sq ft

Wing loading

9.63 lb/sq ft

Power loading

10 lb/hp

Seats

2

Empty weight

1,230 lb

Empty weight (as tested)

1,270 (est)

Useful load

570 lb

Useful load (as tested)

530 lb (est)

Payload w/full fuel

409.8 lb

Payload w/full fuel (as tested)

369.8 lb

Gross weight

1,800 lb

Fuel capacity, std.

164.4 lb

(160.2 lb usable)

27.4 gal (26.7 gal usable)

Oil capacity

8 qt

Baggage capacity

40 lb

Performance

Takeoff distance (ground roll)

475 ft

Takeoff over 50 ft obst

825 ft

Rate of climb, sea level

1,150 fpm

Max level speed, sea level

114 kt

Cruise speed, 75% power

7,500 ft

108 kt

Fuel consumption,

ea engine

57 pph/9.5 gph

Cruise speed, 65% power

7,500 ft

102 kt

Fuel consumption,

ea engine

52.2 pph/8.7 gph

Cruise speed, 55% power

7,500 ft

92 kt

Fuel consumption,

ea engine

42.6 pph/7.1 gph

Range @ 75% cruise w/45-min rsv, std

fuel, best economy

7,500 ft

222 nm

Range @ 65% cruise w/45-min rsv, std

fuel, best economy

7,500 ft

235 nm

Range @ 55% cruise w/45-min rsv, std

fuel, best economy

7,500 ft

278 nm

Service ceiling

17,000 ft

Landing distance over 50-ft obst

850 ft

Landing distance (ground roll)

400 ft

Limiting and Recommended Airspeeds

Vx (Best angle of climb)

59 KIAS

Vy (Best rate of climb)

65 KIAS

Va (Design maneuvering)

120 mph

104 KIAS

Vno (Max structural cruising)

104 KIAS

Vne (Never exceed)

133 KIAS

Vr (Rotation)

48 KIAS

Vso (Stall in landing

configuration)

49 KIAS

All specifications are based on manufacturer's calculations. All performance figures are based on standard day, standard atmosphere, at sea level and gross weight, unless otherwise noted.

**Operations/Equipment Category for aircraft as tested: see June 1981 Pilot, p. 103.*

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not recommended, though, because of restricted visibility.

Control response is light and produces an immediate reaction. The ailerons are a bit heavier than the elevator and rudder. As a matter of fact, the rudder is so light that initially a bit of attention is required to maintain coordinated flight.

There are few sights and sensations as satisfying as seeing the world through and around a pair of wings and sets of flying wires and N-struts.

The aerobatic capability of the Great Lakes is beyond the skill and knowledge of most pilots. It can do just about any maneuver inverted that it can do in positive Gs. The only condition is that inverted flight is limited to three minutes because of the fuel system. There is a header tank that holds 1.4 gallons to keep the engine running during inverted maneuvers. You have to turn right side up to refill it, thus the time limitation.

Whether you restrict maneuvers to steep turns and wingovers or want to hone a competition routine, the Great Lakes is fun, responsive and rewarding to fly. Perhaps pictures describe the Great Lakes better than words. It flies as it looks.

Landings are the most challenging phase of flight for most transitioning pilots; taildraggers are more challeng-

ing, period. The Great Lakes, along with a lot of other conventional-gear aircraft, requires references to the sides to keep the aircraft tracking straight down the runway and largely peripheral vision to correct for drift once you are committed to the flare and landing.

The main gear, which is a complex-looking arrangement of springs and oleo shock absorbers, is quite forgiving of misalignment and high sink rate. The aircraft is considerably less twitchy than many other taildraggers, although it will reward poor or careless technique with an incipient or real ground loop.

For the newcomer, the best thing to calm fears about the initial takeoff roll and the landing is knowing that both are over quickly. Even with average technique and little or no braking (those heel brakes are a bit tough to become accustomed to and are better left alone initially), takeoffs and landings over a 50-foot obstacle require about 1,200 feet.

If you can afford to indulge your dreams, the Great Lakes offers a gentle opening to playing barnstormer or competing in aerobatic contests. For pilots with the aspirations and the bank account, who do not want to build or restore their own, the Great Lakes is a very different kind of production airplane. □

A BIT OF HISTORY

There seem to be a great many misconceptions about the Great Lakes Aircraft Company and the Sport Trainer, the only civilian aircraft the company built.

Harvey R. Swack, AOPA 20220, of Cleveland, Ohio, who fell in love with the Great Lakes as a young lad and later secured the patents, patents pending and approved type certificate for the 2T-1A Sport Trainer, provided much of the following information. AOPA Pilot is grateful for his cooperation. Swack, among other things, currently runs Barney Oldfield Aircraft Company, which offers plans for the

Baby Lakes, a diminutive biplane, and is president of the National Association of Sport Aircraft Designers.

Before the era of the breaking-up of large trust and holding companies, many aircraft manufacturers were owned by automotive trusts. Great Lakes Aircraft Corporation was part of Allied Motors Industries, which also owned the ACE (American Cirrus Engines) Corporation, Elgin Instruments, and the Glenn L. Martin Company. Great Lakes primarily was engaged in the design and building of military aircraft.

The project engineer for the Sport

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Clyde Parsons owned serial number 15. It had one engine swap—to a 150-hp Menasco. He increased the original small tail and changed the engine to a 200-hp Ranger.



Betty Skelton's 'Lil Stinker appeared in many air shows in the late 1940s. It still had the original small tail, but was powered by a 160-hp Kinner radial engine.



Harold Krier's highly modified Great Lakes was a regular at air shows and competitions for years. He added 1 struts, ailerons to the upper wings and more landing wires.

PHOTOGRAPHY COURTESY OF PETER BOWERS

Trainer was Cliff Leisey, who worked for the Glenn L. Martin Company. A few others from that company worked with him on the effort. They studied unsuccessful designs at least in part to analyze the reasons why they failed and so avoid the same mistakes on the Great Lakes. Charlie Meyers, who often is credited with the design, was the test pilot on the project.

Originally, the Sport Trainer had slab sides. Formers to round the fuselage were added later for appearance, although performance in knife-edge flight suffered.

The factory built two basic versions of the Sport Trainer. The 1929 version had dihedral in the top wing because the designers were concerned about a potential Dutch roll with the swept upper wing. The sweep was designed to move the center of gravity aft yet provide access to the front cockpit. The sweep added a distinctive appearance to the Great Lakes that is very much part of its charm.

The 1931 version had a different engine cowl and a flat top wing. The dihedral was not needed. It also had a larger tail assembly. Tex Rankin had suggested a larger rudder and vertical stabilizer; the Great Lakes engineers redesigned the entire tail group.

Jane's All the World's Aircraft for 1933 lists four models: the 2T-1A Type A standard and Type B deluxe, with the Cirrus III, 90-hp engine and the 2T-1E Types A and B with a 95-hp Cirrus Ensign inverted, in-line engine. The B, or deluxe, models were equipped with leather seats, a starter and a compass. Another version, with a 100-hp Kinner, longer gear and a different rear spar, also was offered at one point.

However, by 1933, aircraft were being built to order from piles of parts left over when the production line (one of the first true production lines to be employed for aircraft construction) was shut down in 1931. Approximately 100 Great Lakes were built during the brief production life, which lasted from 1929 to 1931. An additional 15 aircraft were built from the spare parts.

The basic 2T-1A had an empty weight of 1,016 pounds and a 1,580-pound gross; the deluxe had a higher empty weight and a 1,618-pound gross weight. The designers did everything they could to keep the weight down, such as reducing the diameter of the fuselage tubes, particularly in the aft fuselage. Yet, the aircraft was stressed to nine Gs positive and six negative.

The Great Lakes Company went bankrupt in 1936. The destruction of the prototype TG-2 Torpedo Bomber during a flight, with Lee Gelback of

Gee Bee fame at the controls, did more financial damage than the struggling company could handle.

Quite a few Great Lakes were reengineered, primarily with 165- and 185-hp Warner radials, although a few were fitted with Continental radials.

For many years the Sport Trainers were orphans, until 1964 when Swack acquired the rights from the estate of a patent attorney who had purchased them presumably during the bankruptcy proceedings. Swack offered plans for a number of years and kept the corporate identity alive. He had recurring dreams to start building them again as production aircraft.

In 1972, Swack sold the rights to Douglas L. Champlin of Enid, Oklahoma, who established manufacturing facilities in Wichita and finishing operations in Enid.

Champlin's plan to offer the Great Lakes with a modern, production powerplant required that the aircraft be certificated to Federal Aviation Regulation Part 23 from the firewall forward and that drop tests be performed to demonstrate the airframe's ability to handle higher weights.

The first 10 aircraft, all with the 140-hp Lycoming and ailerons on the lower wing only, were built to the 1929 standard, with dihedral in the top wing. All subsequent aircraft were to the 1931 wing design, without dihedral. The Great Lakes had put on weight, and the approved G loading went down to 5.5 positive and four negative.

The 2T-1A-2, with a 180-hp Lycoming and four ailerons, was introduced at the end of 1976. The empty weight was up to an average of 1,230 pounds and the gross to its current 1,800 pounds. The G loadings went down to 5.4 positive and four negative.

Champlin suspended production of the aircraft in 1978 for reasons unrelated to the design. There was a two-year backlog of orders at the time. In 1980, he was persuaded to sell the design to Dean Franklin, an enthusiastic Great Lakes owner. Franklin moved the production line to Eastman, Georgia, that year. The factory was established in a former candy factory.

The current status of the Great Lakes is best described as "built-to-order," or limited production. (The factory reportedly is at work building a lighter-weight version for air-show work.)

The Sport Trainer, carefully conceived, designed and built has had a rocky, if long, life. It has survived because of its well-earned reputation as a beautiful flying biplane and the interest and enthusiasm of a handful of men.

It is good to know it endures. □