

Soon after World War II, war-surplus gliders dominated the market. This L-K 10A (its military designation was TG-4A) has multi-frame canopy panels and stepped windshields.



# LAISTER-KAUFFMAN L-K 10

*Yankee Doodle was born in college, financed by a stockbroker and bought by the U.S. Army.*

BY PETER M. BOWERS

For a decade after World War II, competition soaring in the United States was pretty well dominated by a single design—the war-surplus Laister-Kauffman L-K 10A. Although other surplus training gliders went mostly by their ex-military designations, the Laister design, which had the military designation TG-4A, was universally known as the “L-K.” It was a two-seater, but had evolved from a high-performance single-seater.

In the years immediately preceding the war, the U.S. soaring movement was in a difficult “chicken versus the egg” situation. The growth of the movement was hampered by a lack of suitable gliders, and there was no significant glider industry

because there were so few customers. A few factory-built models were in use, but there were also quite a few that were essentially homebuilts. Some were outright amateur efforts in both design and construction, but there also were a few that had been developed by highly qualified designers and built in suitable shops outside of the recognized industry. A notable example of the latter is the single-seat “Yankee Doodle” developed by a school, the Lawrence Institute of Technology (LIT) at Highland Park, Michigan, near Detroit.

In 1933, Jack Laister enrolled in the aeronautical engineering course at LIT. He

was already a flying enthusiast and had designed, built and flown gliders of his own design while still in high school. He brought one to LIT with him and lost no time in forming a student glider club, using his glider. After obtaining faculty support for gliding, he had the students build a two-place glider of his design in the school shops.

Laister was well along on the design of a new high-performance single-seater when George Lawrence, president of LIT, suggested to him that the school ought to have another glider project under way. When Laister showed him the drawings of his new design, Lawrence arranged for the school to complete the design details and build the glider. Laister then went to work on the project practically full time. The new ship, officially designated Lawrence Tech IV but nicknamed Yankee Doodle, was completed in June 1938.

The design was thoroughly conventional for the time, with a two-piece, full-cantilever wing attached to tubular wing roots that extended from the welded steel-tube fuselage structure in what could be called a high mid-wing position. The straight-tapered wing used a single, wooden box spar, with plywood around the leading edge for torsional stiffness. The steel-tube fuselage was a preferred American practice; most European gliders still used wood. Another American detail was the use of a single landing wheel nested in the fuselage when European designers still preferred skids.

Unlike many contemporary American designs, which were primarily open-cockpit trainers, the Yankee Doodle had a neatly streamlined nose and a clean curved



*This is the same aircraft shown above. It has been modified with a bubble canopy, cleaned-up nose and wing roots and a takeoff dolly instead of the landing wheel.*

The most notable feature on the 1938 single-seat Lawrence Tech IV is its graceful gull wing.



This L-K was modified greatly with separate bubbles for each cockpit, an extended rear fuselage, an enlarged vertical tail and a retractable main wheel.

canopy. But the most notable detail of the LIT glider, when viewed from almost any angle, was the graceful gull wing.

Why a gull wing? There are several valid reasons to justify the added structural complexity: wing tips farther above the ground for rough-terrain landings; better visibility through certain angles; more stability in circling flight; and, the real reasons, aesthetics.

Wolf Hirth—one of the leading German glider manufacturers of the 1930s and producer of a very popular high-performance gull-wing sailplane, the "Minimoa"—was at a technical meeting when the point was made that gull wings did nothing to improve the sailplane's performance. Afterward, someone asked him why he used the gull wing, since he obviously knew this before he designed the Minimoa.

Hirth replied, "True, the gull wing didn't improve the performance any; but it sure sold a lot of Minimoas!"

The Yankee Doodle was an excellent sailplane for its time and should have been a logical candidate for production. However, LIT had no facilities or staff for such work, so only one was made.

By early 1941, the U.S. Army and Navy had become very impressed by the successful use of troop-carrying gliders by the Germans, and hurriedly set up a U.S. military glider program. This had to be started from scratch—not only did big cargo gliders have to be developed, but so did training gliders and the schools in which they would be used. The existing glider movement, the industry and just about anyone

with glider experience were interviewed by the Army. Although Laister, who was working for Curtiss-Wright in St. Louis, was not then in the established glider industry, he was invited to Wright Field to present details on his past designs. His old two-seaters were unsuited for military training, but the single-seat Yankee Doodle had good potential and easily could be stretched to accommodate two.

As a result of his interview, Laister was invited to submit a proposal for the design and manufacture of a two-seater. To handle the manufacturing, he joined with St. Louis stockbroker John Kauffman to form the Laister-Kauffman Aircraft Corporation and establish a small plant in St. Louis. The bid was accepted, and the new firm received an order for three flying prototypes of a trainer designated XTG-4, plus one static test article, in October 1941.

The first XTG-4, which was known in the factory as the L-K 10, was delivered to Wright Field in February 1942. This was simply a stretched Yankee Doodle. It had a longer fuselage, four feet more wingspan and an elongated military-type canopy over both cockpits. The major structural change was to eliminate the gull wing in the interest of simplified manufacture.

The Army ordered 150 TG-4As, which the company called L-K 10A. These were delivered with trailers, as were similar training gliders from other manufacturers.

In its stock two-seat configuration, the L-K was a good trainer but had some sneaky tricks. In addition to being very light on the pitch controls, the mid-wing

configuration sometimes caused it to spin "over the top" from a skid, particularly if it was flying a little tail-heavy. The fuselage would blank out some airflow over the root of the inside wing during a skid, and over the craft would go.

Another characteristic that made the L-K tricky as a trainer, particularly on pavement, was the location of the center of gravity (CG) relative to the wheel. On the other military and most civil trainers, loaded CG was ahead of the wheel and the glider rested on the nose skid and the wheel. This provided automatic drag, or braking, to smooth out rough automobile or winch-tow starts. The L-K required fast work with the hand brake during such starts. The forward location of the wheel sometimes led to mild ground loops when landing on pavement with a spring-leaf tailskid or a full-swivel tailwheel.

The sailplane trainers, based on prewar technology and soaring procedure, soon proved unsuitable to the military and were declared surplus. The Army decided to give its student glider pilots primary training in light airplanes and then familiarized them with actual glider operations in de-engined lightplanes such as the Taylorcraft TG-6 (see "Yesterday's Wings: The Taylorcraft Tandems," July *Pilot*, p. 73). But this program change did not put Laister-Kauffman out of business; the firm built 750 Waco CG-4A cargo gliders and developed a large, wooden cargo glider of its own, the XCG-10 Trojan Horse.

Military work was cut way back after the war, and the firm tried to get into the civil

market with a civil L-K 10B model, the Yankee Doodle II. It also bought the rights to the prewar Bowlus "Baby Albatross" one-place sailplane. Such efforts failed, however, because several hundred of the surplus military training sailplanes, including Laister-Kauffman's own TG-4A/L-K 10As, came on the market at a fraction of the cost of factory-new gliders. This was a switch on the chicken-versus-the-egg situation. Although there were now more customers for gliders, they did not have to buy new from the factory; so the industry was still stymied.

As a result, the war-surplus models dominated the soaring scene for more than a decade. Quite a few are still in service as trainers and acknowledged antiques, the now-booming soaring movement having its own Vintage Sailplane Association for designs more than 30 years old (3103 Tudor Road, Waldorf, Maryland 20601).

Although the surplus models wiped out Laister-Kauffman's anticipated civil market, the firm did help the movement. The company published a service bulletin to inform owners of the modifications required by the Civil Aeronautics Administration that qualified the TG-4A/L-K 10A for a standard licence under Glider Approved Type Certificate G-15, which was issued June 8, 1945.

Being the most numerous of the surplus models, as well as having better all-around performance and versatility, the TG-4A pretty well dominated the movement and

the early postwar contests. The L-Ks earned further distinction as the result of an extensive modification program. This started at Mississippi State University in 1948 as an aerodynamic research program, not an attempt to improve the L-K per se. Three L-Ks were converted to single-seaters, with recording equipment in the rear cockpits. The most visible change was to the upper fuselage superstructure. In a procedure called flat-topping, the structure was removed down to the top longerons, the nose contours were lowered and smoothed and a close-fitting bubble canopy was provided for the pilot in place of the former high-drag military windshield and canopy assembly.

This major change was accompanied by less noticeable changes that did as much or more to extend the 23:1 glide ratio. This included careful aerodynamic smoothing of the wing, extending the leading edge plywood well aft on the upper surface, sealing the myriad gaps in the original design, removing excrescences and cleaning up drag-producing intersections. The aerodynamics balance areas of the elevator and rudder were removed.

The benefits of the changes, which did not compromise the structure or aerodynamics of the basic design, encouraged the University of Illinois Glider Club to obtain FAA approval for them. A supplemental type certificate was granted in June 1958, at which time the L-K 10 design was 16 years old. The Laister-Kauffman firm was

still extant, though inactive, and made the approved modifications available through another service bulletin.

This triggered a great variety of "homebrew" modifications within the specifications by private owners. Not all went the full flat-top route; many opted for only partial modification. Some retained both seats, using either separate bubbles for each cockpit or a single, long, low canopy. There also were partial flat-tops and the simplest of all modifications, the "bunny nose," which merely replaced the military windshield and forward canopy with a contoured windshield like that of the 1939 Yankee Doodle.

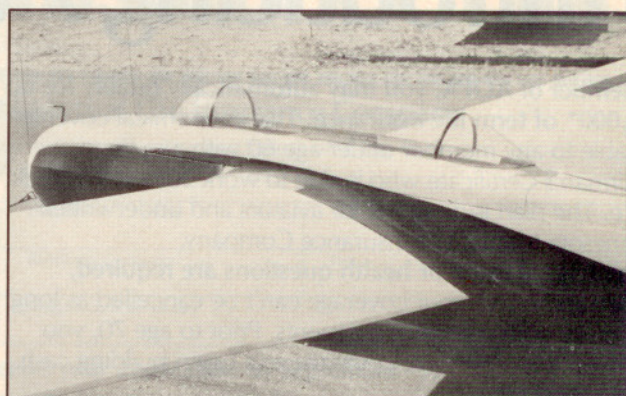
Other owner/pilots performed more extreme modifications that called for experimental licenses, including lengthening the fuselage to cut down on pitch sensitivity, extending or clipping the wings, installing retractable landing gear and even building engines into the nose to provide self-launching capability. One amateur fitted L-K wings to a homebuilt fuselage and won sixth place in the 1952 U.S. National Championship and second place in 1955.

Since the L-K is no longer competitive, and a point or two in glide ratio is not important, some modified L-Ks are now being restored to their TG-4A configuration, 1942 Army coloring and all. □

*Intrigued by airplanes long before his first ride in a Travel Air at age 10, Peter Bowers, AOPA 54408, has since logged more than 4,200 hours.*



*Simplest of all the clean-up modifications on the Laister-Kauffman was the bunny nose, which replaced the military's stepped windshield with extended molded plexiglass.*



*Still another canopy variation, this Laister-Kauffman glider shows a flat-top modification. The long, one-piece canopy over both cockpits did not change the fuselage below the upper longerons.*

#### LAISTER-KAUFFMAN L-K 10A Specifications

Wingspan	50 ft
Length	21 ft 3 in
Wing area	166 sq ft
Wing loading	5.27 lb/sq ft
Empty weight	475 lb
Gross weight	875 lb

#### Performance

Never-exceed speed	115 mph (military)
	140 mph (civil)
Auto winch tow speed	63 mph
Landing speed	40 mph
Glide ratio	23:1
Minimum sink rate	3 fps