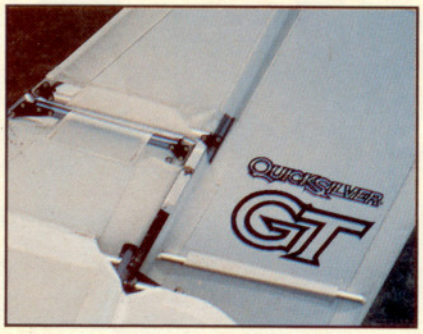
PIPE FLIGHT

Eipper's new design blurs the distinction between ultralight and airplane.

BY MARK R. TWOMBLY



When the ultralight phenomenon began to gather momentum nearly a decade ago, it was hailed as a new beginning for aviation. The prospect of inexpensive flying, unencumbered by restrictive licensing and operating rules, led to predictions that ultralights would become an enduring subset of general aviation. A new generation of recreational pilots would emerge, with many moving up to replenish the shrinking pool of certificated pilots, or so the thinking went.

Thousands did take to the air in ultralights, but by the end of 1983, it was clear the craze had peaked. Since then, the ultralight industry has shrunk dramatically. Most of the small, backyard manufacturers are gone, along with some of the big established ones. Eipper Industries, which dominated the industry with total sales of 9,000 Quicksilver ultralights, is typical of once-large manufacturers that have survived the shake-up by making cuts in personnel, facilities and dealer networks.

Enter the Quicksilver GT400, a new design from Eipper that straddles the fence separating ultralights and airplanes. With cable-braced wings, it qualifies as an ultralight, according to Eipper. Federal Aviation Regulation Part 103, which governs ultralight specifications and operations, limits a powered ultralight vehicle to a single seat (an exception is made for two-seaters used for ultralight flight instruction), a maximum empty weight of 254 pounds, no more than a five-gallon fuel capacity and a maximum 55-knot top speed and 24-knot stall. Ultralights can only be flown for sport and recreation; no utility or commercial use is permitted. The FAA also intended that ultralights be operated in sparsely populated areas and away from other aviation traffic. There are no FAA requirements for airworthiness certification or registration of ultralights or for formal training and licensing of ultralight pilots, although Eipper requires non-rated pilots to take at least five hours of dual instruction and a supervised solo check-out before flying the GT. Eipper recommends that rated pilots receive a check-out in a two-place ultralight.

The strut-braced GT exceeds the maximum empty weight allowance and is sold as a kit aircraft. It must be inspected by and registered with the FAA, certificated under the amateur-built, Experimental category, and the pilot must possess at least a student pilot's certificate to operate it. In general, experimentally registered aircraft operate under the same rules as certificated, production aircraft, although they cannot be used for compensation or hire.

Eipper set the standards for design, construction and marketing of ultralights and rode the crest of their surging popularity in the early 1980s. Now Eipper no longer sells its single-seat MX-series ultralights in the United States. Company President Lyle M. Byrum fears the liability exposure. The GT and two-seat MXLII are the only aircraft Eipper distributes in this country. Last winter, Eipper began manufacturing a four-wheel off-road vehicle called the Quicksilver SR. The company hopes its dune buggy sales and production will smooth out the seasonal variations in ultralight production.

The GT, with its conventional empennage, double-surface wings, three-axis controls and flaps, invites comparisons with conventional, certificated airplanes. Such comparisons come naturally since the GT can cost as much as a used, light single. The basic kit, with engine, small nose fairing and airspeed indicator, sells for $7,995. A fully assembled GT with a few options can easily exceed $10,000. The one that *AOPA Pilot* flew and photographed was priced by the dealer, Windstar Aviation of Churchville, Maryland, at $12,300 because of options including an electric starter ($400), engine and flight instruments ($414), cockpit fairing ($540) and fuselage cover ($455), wheel pants ($110), custom paint and pin striping ($340) and Windstar's assembly of the kit. Eipper estimates 80 hours assembly time; Windstar took about 100 hours because of additional painting required and installation of options.

The GT may win over a certificated aircraft in a comparison of operating expenses, but the margin could be surprisingly close. A major overhaul of the GT's Austrian-built two-stroke, 40-hp Bombardier-Rotax engine costs only about $350 to $400, according to Windstar, but recommended TBO is just 250 hours. If the GT is tied down outside, unprotected, count on an annual $1,200 bill for replacing the Dacron polyester sailcloth. The wing and empennage covers will last longer if the GT is kept under roof, but ultralight hangar space is scarce and costly.

The closing argument in a skeptic's dismissal of ultralights that try to be airplanes is the lack of utility compared to even the simplest of conventional aircraft. The question is a familiar one to ultralight enthusiasts: Why buy one of those when you could get a Piper Cub for the same money?

Head to head comparisons of ultralights and airplanes miss the point. People buy different types of aircraft for very different reasons. A Cessna Skyhawk offers utility; a Cub delivers nostalgia and simplicity. Ultralights offer a unique kind of no-

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frills flying that is unattainable in conventional aircraft, Cub included. Ultralight flying means mechanically simple machines that can be assembled and maintained by the owner and that fly low, slow and easy, purely for the sport of it. In that context, the GT400 belongs in the ultralight camp.

Eipper's claim that the cable-braced GT qualifies as a legal ultralight may be academic. Company literature lists the empty weight as 254 pounds. A single option such as wheel pants, a fuselage enclosure or even a magnetic compass will put the machine over the weight limit for ultralights and into the same category as the strut-braced GT.

The 322-pound strut-braced, Experimental-category GT that *AOPA Pilot* flew is equipped with a fuselage enclosure and fiberglass cockpit fairing with a narrow plastic windscreen. There is little wind in the cockpit while flying. It was possible to juggle a sectional chart and a notebook without having them snatched away by the slipstream.

An excellent four-point restraint system, which is standard equipment, secures the pilot, and a full complement of optional instruments fills the panel: airspeed indicator marked in miles per hour, magnetic compass, altimeter (no Kollsman window, though, so forget about ATC altimeter-setting updates), tachometer, exhaust-gas and cylinder-head-temperature (EGT/CHT) gauges.

And placards. Lots of placards. There are exhortations to conduct thorough preflight inspections, to monitor the fuel supply in flight (not an easy task, especially with a full-coverage helmet on, since you have to crane your neck around 180 degrees to see the fuel tank), to avoid flight in known carburetor icing conditions (sorry, no carb heat available), to avoid taking off when the CHT is below 150 degrees and to shut down when it is above 200 degrees. There is even a placard urging the pilot to read the other placards and the owner's manual.

The airframe is built around a five-inch-diameter, .058-inch-thick aluminum pipe that forms a continuous fuselage boom. Empennage controls are routed through the pipe. The wing structure consists of leading- and trailing-edge aluminum-tube spars separated by compression struts and airfoil-shaped ribs. Dacron polyester-fiber sailcloth covers both the upper and lower surfaces of the tapered wing. The Quicksilver GT has ailerons, and its four-position flaps extend down to 30 degrees.

The nosewheel is steerable and is fitted with a heel-operated tire-scrubber brake. This rudimentary brake is useful in slowing the GT while taxiing and at the conclusion of the landing roll, but it is no substitute for real main-wheel brakes.

The flaps are controlled by a handle located over the pilot's right shoulder. A small nipple on the handle slips into detents at 10-, 20- and 30-degree settings. It is difficult to see the mechanism when you are aloft because of its awkward location, and at higher airspeeds, airloads make it difficult to slide the handle to the desired setting.

Preflight inspection is detailed and lengthy. Dozens of bolts, castle nuts, clevis pins and lock rings must be checked. Aluminum tubing is examined for nicks and dents that compromise structural strength. Zippers in the wings, ailerons, flaps and center-fuselage cover allow the pilot to inspect the spars, compression struts, bellcranks and other hardware. Sailcloth must be examined for rips, wear and other damage. The thin material is stretched tightly over the wing and tail structures and wears rapidly under any sort of chafing.

Ultraviolet rays deteriorate sailcloth. Byrum claims the sailcloth should last for 2,000 to 3,000 hours of exposure to the sun before it must be replaced. That is the equivalent of about one-half to three-quarters of a year of 12-hour days under the sun. The GT owner's manual states that the sailcloth has a life expectancy of six months or less if left

Eipper Quicksilver GT400

Base price $7,995

Price as tested $13,200

Specifications

Powerplant	Bombardier-Rotax 447 two-stroke, two-cylinder 40 hp @ 7,000 rpm
Recommended TBO	250 hr
Propeller	Wooden, fixed-pitch two-blade, 60-inch diameter
Length	19 ft 9 in
Height	7 ft 9 in
Wingspan	30 ft
Wing area	146 sq ft
Wing loading	3.6 lb/sq ft
Power loading	13 lb/hp
Seats	1
Empty weight; includes pilot/vehicle recovery system	
cable-braced	271 lb
strut-braced	277 lb
Empty weight, as tested	322 lb
Gross weight	520 lb
Useful load cable-braced	249 lb
strut-braced	243 lb
Useful load, as tested	198 lb
Payload w/full fuel	
cable-braced	219 lb
strut-braced	213 lb
Payload w/full fuel, as tested	168 lb
Fuel capacity, std	30 lb (28.5 lb usable) 5.0 gal (4.75 gal usable)

Performance

Takeoff distance, ground roll	100 ft
Takeoff distance over 50-ft obst	300 ft
Max demonstrated crosswind component	10 kt (landing)
Rate of climb, sea level	900 fpm
Max level speed, sea level	53 kt
Cruise speed/Range, no reserve (fuel consumption)	
@ 75% power	50 kt/63 nm (24 pph/4 gph)
@ 65% power	48 kt/68 nm (21 pph/3.5 gph)
@ 55% power	44 kt/74 nm (18 pph/3 gph)
Service ceiling	10,000 ft
Landing distance over 50-ft obst	385 ft
Landing distance, ground roll	120 ft

Limiting and Recommended Airspeeds

Vx (Best angle of climb)	29 KIAS
Vy (Best rate of climb)	32 KIAS
Va (Design maneuvering)	61 KIAS
Vfe (Max flap extended)	54 KIAS
Vno (Max structural cruising)	61 KIAS
Vne (Never exceed)	74 KIAS
Vs1 (Stall clean)	31 KIAS
Vso (Stall in landing configuration)	27 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.

outdoors without protection. Sail life can be extended if it is wrapped in covers or if the aircraft is hangared. A puncture test kit is included in the GT kit.

The two-cylinder Rotax 447 engine supplies ample muscle for the GT. Eipper claims a takeoff ground roll of 100 feet and a 900 fpm rate of climb. The GT reaches flying speed at about the same time the throttle reaches the stop. The angle of climb at the recommended full-power climb speed of 35 knots (40 mph) is impressive—even more so if you select 10 degrees of flaps before takeoff. For a real circus ride, follow Eipper's recommended short-field takeoff procedures: 20 degrees of flaps, full throttle while applying the brake, tail low attitude on the brief ground roll and an initial climb speed of about 29 knots (33 mph).

Flaps span about half of the trailing edge of the wing. Flaps were necessary to meet the maximum 24-knot stall speed specified in FAR Part 103, according to Eipper. The GT's handling is characterized by slow, heavy ailerons; fast, positive rudder control, and good pitch authority.

Stalls are preceded by a noticeable buffet, followed by a clean break at about 26 knots (30 mph) with no flaps. The stall speed drops a knot or two with each 10 degrees of flaps. No matter what the flap configuration or power setting, the right wing on the GT we evaluated stalled first.

Maximum flap extended speed is 47 knots (54 mph). Maximum structural cruising speed is 53 knots (61 mph). Both are easily exceeded. If you lope along at a leisurely 39 to 42 knots (45 to 48 mph), which is a good speed range for hands-off, level flight, then momentarily advance the throttle, the pointer on the airspeed indicator will shoot past the top of the green arc and into the yellow caution range with no apparent inclination to poop out before reaching the never-exceed redline speed of 64 knots (74 mph).

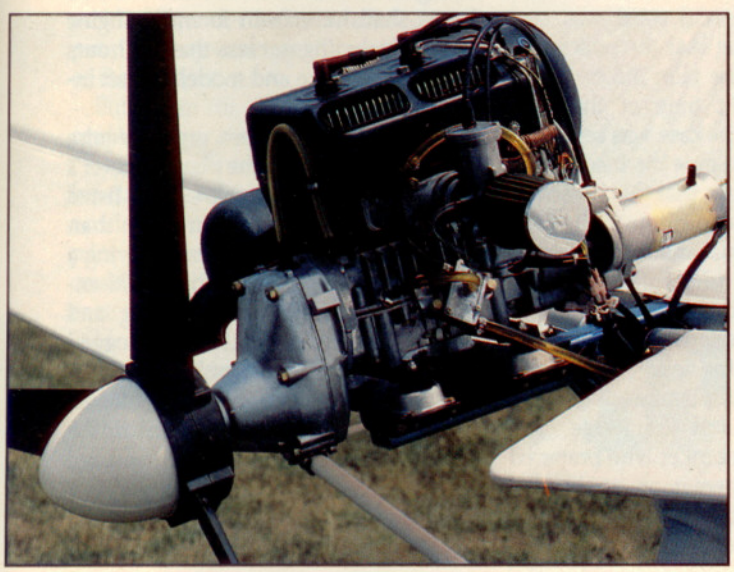
The experience convinced us to forego a full-power, level-flight speed run. It is clear that the GT pilot must exercise restraint in his application of throttle to avoid busting airspeed limitations. On the other hand, the lightweight aircraft responds instantly to power changes, and an overspeed can be brought under control almost immediately.

The never-exceed speed is conservatively low, according to Byrum, who said the GT has been dive-tested at 96 knots (110 mph). Eipper also spin-tested the GT, but, according to Byrum, it could not be made to enter a fully developed spin. The GT is placarded against aerobatic maneuvers, including spins. Pitch and bank angles are limited to a maximum of 30 degrees and 60 degrees, respectively.

Approaches and landings are simple. The target speed is the same as climb-out: 35 knots (40 mph). Flaps help point the nose down and increase the descent rate, but they are not really necessary unless you are aiming for a *very* short field. In flight, the nosewheel does not lock in trail, so it may be cocked in a crosswind landing when the nosewheel plunks down.

The GT is a delight to fly. It has ample power for short takeoff runs, steep climbs and brisk cruising. Though sluggish in roll, it responds adequately to control inputs, even in gusty and crosswind conditions. The yoke, flaps, three-axis control and variety of options should interest pilots transitioning from conventional airplanes, and instill in novice pilots the confidence that the GT is more conventional airplane than not.

Very light aircraft designs, like the GT400, give recreational pilots an attractive alternative to true ultralights and conventional airplanes. The GT combines many of the best features of each and also some of the worst. It is as expensive as some airplanes, yet is saddled with the bane of ultralights: the limited life of the sailcloth. In spite of the GT's drawbacks, Eipper is counting on its real-airplane features to appeal to people who otherwise dismiss ultralights as flimsy, dangerous and a nuisance. □



The light stuff (clockwise, from above): Overhead flap handle; motorcycle battery and plastic fuel tank; go-cart yoke; two-stroke engine; reduction gearbox and three-blade composite pusher propeller.