

The "Trike" a Magnificent Flying Machine

An Introduction to Trikes



The "trike" is a large, engine-powered hang glider, with a fuselage (including landing gear) suspended from the wing. Instead of launching into the air from the side of a hill, as traditional hang gliders do, the trike is able to self-launch on a level surface by rolling on its wheels and using the power of its rear-mount engine.

The trike wing is much larger than a traditional hang glider wing. Wings vary in size from 160 to over 200 square feet; they are about 30 feet long. The largest wings can carry a maximum weight of approximately 1000 pounds. They can be folded up and transported in a trailer or on top of a truck.

The pilot sits upright in the fuselage (called a "carriage") instead of lying prone. Many trikes have two seats, and are able to carry a passenger.



Unlike an airplane, a trike has no tail surface (rudder/elevator) or ailerons. Pitch and roll control are possible by directly changing the angle of the wing with a control bar in front of the pilot. The control inputs are opposite from airplane controls. For example, to flare the trike on landing, the pilot pushes the control bar away from his body, instead of moving the control wheel toward his body.

The trike can be steered on the ground by pushing on foot pedals attached to the nose wheel. Steering inputs are opposite to airplane steering. If one wishes to steer a trike to the left, he pushes on the right foot pedal, like a snow sled.

The engine throttle is mounted on the right foot pedal. Foot brakes are mounted on the left pedal. Many trikes also have a hand throttle on the fuselage, to which the pilot can constantly push down with his foot to maintain power.



Engines vary from 25 hp to 100 horsepower. Most trike power plants are two-cylinder, two-stroke engines with about 60 horsepower. The "Rotax" brand engine is the most popular. Rotax also manufactures the engines used on jet skis and snowmobiles.

The fuselage on most trikes consists of simple tubing, with the pilot exposed to the air. The most sophisticated trike has a fully enclosed fuselage with retractable landing gear and a propeller which can be stopped and "feathered" in flight for optimum soaring. All trikes have three wheels, hence the name "trike" from "tricycle."

A trike has remarkable performance specifications. Most trikes can carry a load up to half their empty weight. For example, a typical 350-pound trike can carry two people, fuel and baggage, for a total weight of 900 pounds.

A trike can usually takeoff and land in about 100 feet. It can climb at 1000 feet per minute. A typical trike can fly up to 70 mph with a stall speed of only 30 mph. Many trikes have large wheels in order to operate from rough terrain. Some trikes can be fitted with wheels, snow skis, or water floats.

The range, endurance and fuel consumption varies greatly with size of the trike and fuel capacity. A typical trike carries about 10 gallons of fuel. It can fly for three hours, for a distance of 120 to 150 miles. Pilots have actually flown around the world in sophisticated trikes, taking several months to do so.



A pilot can also shutdown the engine and soar the trike if the rising thermal is sufficiently strong. However, the lift-to-drag ratio and sink rate of a heavy trike is not as conducive to soaring as a traditional hang glider. To stay aloft, a trike needs rising air of about 450 feet per minute. Lift-to-drag ratio commonly varies from a low of 7:1 to a high of 10:1.

It is a struggle to control some lightweight trikes in turbulent air. In addition, it is difficult to land a trike in a crosswind, since there is no rudder to align the fuselage with the runway, such as an airplane has. When landing in a strong crosswind (10 knots or so) trike pilots try to angle into the wind as much as possible; even landing diagonally across the runway, if necessary.

A trike can be assembled or disassembled by one person. It can be towed on a trailer to an airport or field for takeoff. It can be stored at home, thus avoiding hangar or tie down fees at an airport.

Just like an automobile, the cost of a trike varies with the options one chooses. A simple single-seat trike with only a couple of flight instruments sells for about \$6,000. A very sophisticated two-seat trike with an enclosed fuselage, a four-stroke engine, a large array of engine and flight instruments, radio, transponder, and GPS can cost more than \$40,000. The most common price range for a single-seat trike is about \$15,000.

Many trikes are available completely constructed by the manufacturer. It is shipped with the wing folded up. The buyer needs only to unfold the wing, attach the "battens," and attach the wing to the fuselage. Other trikes are sold in kit form. The buyer must assemble the fuselage and attach the landing gear and engine. A typical assembly time is 50 to 80 hours.

Trikes can be mounted with a ballistic parachute attached to the fuselage. In the event of a catastrophic failure or mid-air collision, the pilot can deploy the parachute, which will lower both the pilot and the trike together to a safe touchdown. A parachute costs approximately \$2500 and weighs about 25 pounds. The rate of descent is about 20 feet per second.

Except for the United States, the trike is the most common form of recreational aviation throughout the world. In almost all countries, the trike is certified by the government as a "microlight," and the pilot must obtain a license.

In the United States a trike can be flown as an "ultralight." The FAA governs ultralights under Federal Aviation Regulation 103. FAR 103 states that a pilot's license is not required to fly an ultralight. Nor must the flying machine be certified by the government.

However, to qualify as an "ultralight" the flying machine (whether an airplane or trike) must meet certain weight, fuel, and speed restrictions. Most important, an ultralight must be flown in rural areas only; it cannot be flown over a city, or what the FAA calls a "congested area."

There are thousands of ultralight trikes being flown in the United States. However, many people have never seen one fly because they are operated in rural locations, away from populated areas.

It is possible to circumvent the ultralight restrictions by putting an ultralight, including a trike, into the FAA "experimental" category, which most people call "homebuilt." Placing a trike into the experimental category requires a certain amount of paperwork and an inspection of the craft by an FAA examiner.

Once a trike receives the experimental airworthiness certificate, it is no longer bound by ultralight restrictions. An experimental trike may carry more fuel at a higher speed than an ultralight trike. Most significantly, it can be flown at airports which are normally off limits to ultralights, including airports which are located within congested areas or within a metropolitan city.

In order to fly an experimental trike, the pilot must obtain an FAA pilot's license. Since a trike is a large hang glider, the FAA refers to a trike as a "self-launching glider," which the layman calls a "motorglider." The procedure for obtaining a license to fly a motorglider is almost the same as the training required to fly a traditional sailplane without an engine.

The training requirements for a private pilot glider license are found in FAR 61.101(f). The FAA minimum flight time required to qualify for a glider license is no less than for an airplane license.

If a person decides that he only wants to fly a trike, and not a traditional hang glider, it is possible to receive all his flight training in a trike, and to take his flight examination in a trike. At the completion of the flight check, the student receives a "glider" license, limited to trike flying.

More information about the "glider-trike" pilot's license can be found by calling the U.S. Ultralight Association at 301-695-9100.