



FAQ ABOUT GLIDERS & SOARING

MEDIA BACKGROUND

Media Guide to the
Frequently Asked Questions
About
Gliders and Soaring
By
United States
Soaring Teams

Last Update
August, 2004

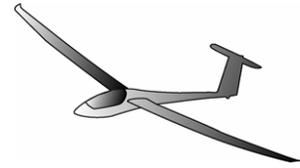
This is your guide to some of the most frequently asked questions about the sport of soaring.

Whether you are seeking a local club angle, dramatic contest coverage, a technology story, human interest, the history angle or international championship coverage, soaring has something for you. The sport is diverse, colorful and pulls together many potential story ideas for print editors and video professionals alike. This information is brought to you by U.S. Soaring teams without copyright for use by the media in coverage of the sport or U.S. soaring teams. See the U.S. Team Press Room for more background on the exciting sport of soaring. www.ssa.org\usteam\ust_press.htm

Frequently Asked Questions about Gliders and Soaring

What is the proper term for the aircraft--Glider or Sailplane?

Either one, mainly "glider". A glider is any motorless aircraft, this is the generic and colloquial term used by sailplane pilots themselves. In the USA, the FAA aircraft category designation for sailplanes and motorgliders (motorized sailplanes) is "glider". The word "sailplane" came about in the 1920s to distinguish refined gliders from "secondary" and lowly "primary" training gliders. Since the 1970s, the term has been useful to mark a distinction from hang-gliders. See the Press Room for a glossary of terminology.



Sailplanes or gliders as they are often referred to are sleek, strong and fast.

What is the proper term for the activity--Gliding or Soaring?

Either one, mainly "soaring". The term Gliding is used in the United Kingdom and internationally, as in British Gliding Association, World Gliding Championships. The term Soaring is used extensively in the United States as in Soaring Society of America. Technically, "soaring" refers to the act of maintaining or gaining altitude in unpowered flight (aided by rising air). This is what pilots seek to do while gliding down relative to the surrounding air.

What is the relationship to Hang-Gliding and Paragliding?

It is the same nature sport at a different scale. Technically, sailplanes, hang-gliders, and Para gliders are just different styles of glider used to pursue gliding and soaring for recreation, in the same way that sailboats and windsurfers share the lake and the wind. Each has advantages--from low cost for Para gliders to high efficiency for sailplanes. In practice, the pilot communities are very separate although the USA national associations cooperate fruitfully.

Which came first--the Hang-Glider or the Sailplane?

Both. In living memory, mainly the sailplane. The world's first consistent pilot, Otto Lilienthal, flew a foot-launched hang-glider by weight-shift control in the 1890s. The Wright brothers' 1902 glider was more of a sailplane with its assisted launch and aerodynamic control surfaces. Extensive German glider experiments in the 1920s started out with hang-glider designs but rapidly evolved to sailplane configurations for better aerodynamic performance. Hang-gliding revived in the USA in the 1970s as a low-cost unregulated means of flying, mostly independently of the already thriving sport of sailplane flying (then and still called "soaring" even though hang-gliding rapidly focused on soaring as well).

What is the difference between a Hang-Glider and a Sailplane?

Mainly weight and glide capability. Hang-gliders are designed for light weight (70 lb.), portability, on a car rooftop, and low cost, usually under \$10,000 new. They are mostly flexible wings steered by the pilot shifting their weight. Hang-gliders were originally launched by running downhill solo, although towing by car and ultralight airplane has become increasingly popular.



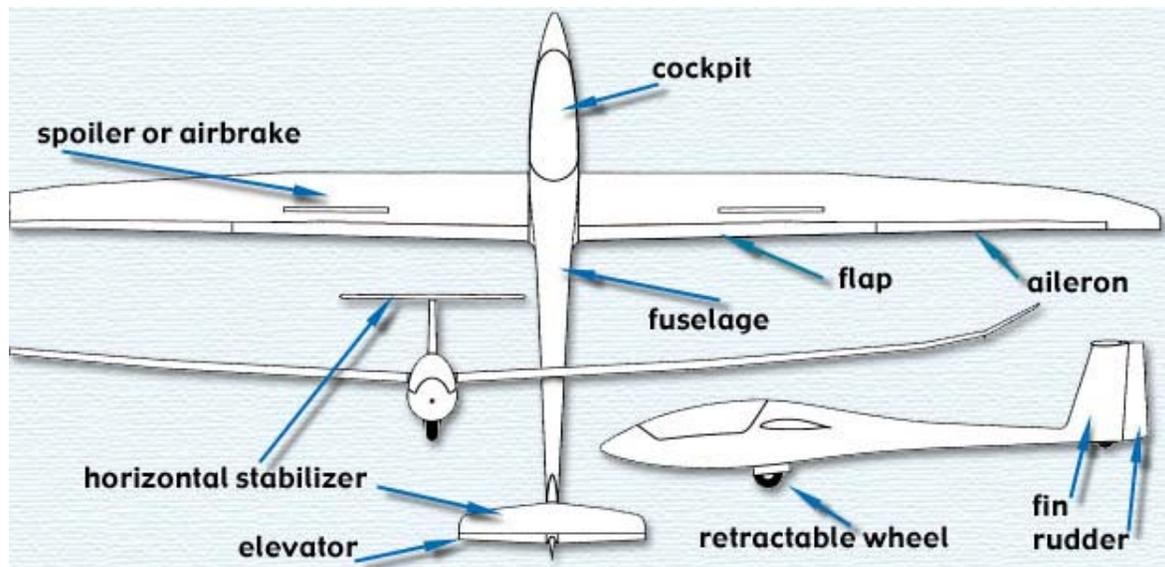
High performance Ventus 2b Sailplane after landing. Image by Bill Hoadley

The newer category of Para-gliders consists of ram-air parachutes that omit rigid elements of hang-gliders (aluminum or carbon fiber tubes) and thereby score even higher on the light, portable, and cheap scales. However, these attributes limit aerodynamic efficiency, and Para-gliders rarely achieve glide ratios greater than 8:1 (8 feet forward for 1 foot of altitude lost), hang-gliders 16:1, whereas sailplanes routinely achieve 40:1.

Compared to hang-gliders and Para-gliders sailplanes weigh much more at between 500 and 1500 lbs., feature a full enclosed cockpit and utilize 3-axis aerodynamic controls. Sailplanes fly considerably faster than hang-gliders or Para-gliders reaching top speeds of 160 mph and sailplanes are certified by government agencies such as the Federal Aviation Administration (FAA). The biggest difference between sailplanes and hang-gliders is performance in which the sailplane is the undisputed king of high performance soaring.

What are the names of all the sailplane parts?

Sailplanes have a number controls, surfaces and parts all with their own names. Many of these terms are exactly the same used for all other aircraft. Here are the main parts of a sailplane...



How can a sailplane get airborne?

Mainly by aero towing. Aero towing is accomplished by flying in formation with a power plane (tug) on a short rope. The other launching methods include kiting up on a long cable drawn by a winch or car (ground launch). Sometimes, sailplanes also take off with an on-board auxiliary engine (motor launch). Over flat ground, a launch to 2,000' usually suffices to contact lift. Even a heavy modern sailplane can get to flight speed by being hand pushed or towed down a windy slope, but it amounts to a 1930s nostalgia exercise at the few places it is still done.



*Two place trainer ready to aero tow connected by 200 feet of special rope.
Image by Bill Hoadley*

How is a sailplane steered?

With the same aerodynamic controls as light airplanes. Stick (for the right hand) and rudder (for the feet) are the primary flight controls for speed and direction adjustments. The analog to the throttle for altitude control is the spoiler handle (for the left hand), although it only increases rate of descent and cannot enable a climb at will. A release knob allows terminating a tow at any time. More exotic sailplanes have retractable landing gear, flaps, water ballast tanks, and even auxiliary engines.

What keeps a glider up?

"Lift", rising air. It is an exercise in relativity: a sailplane typically sinks 200 feet per minute (about 2 mph) through the air that surrounds it. If that air is moving upwards faster than 2 mph, the glider rises relative to the ground. In the early 1920s, glider pioneers were doubtful that consistent large upward currents of 2 mph could reliably develop in the atmosphere and be exploited by pilots. Perhaps soaring was only for the birds, slow and maneuverable as they were. Once they tried, they soon found out that useful lift is quite common and it is a rare day that a glider cannot do at least a little soaring.



Thermal lift is the most common form of rising air that keeps sailplanes aloft.

What makes lift?

Sun and wind. Given that winds ultimately derive their energy from sunlight, soaring is a solar-powered sport. In order of discovery, the classic forms of Lift are: *Ridge:* wind deflected upwards by a slope. *Thermal:* warmed air rising from a hot spot on the ground. *Wave:* wind compressing and rebounding after passing a slope. Individual thermal convection cells, "thermals", are ubiquitous on most summer days and make the sport possible all over the world with no need for wind or hills. Combinations of lift mechanisms, such as thermal-induced waves, air mass convergences, morning slope winds, wind shadow thermals, or vortex streets enrich and extend the range of opportunities.

Is there a season for soaring?

Yes, mainly summer. Thermals are the most common source of lift, and weather patterns and sun angles favor them in the Summer. Some pilots like to soar in the Northern Hemisphere in June and the Southern Hemisphere in December if they can afford the travel. On the other hand, waves and ridge lift are more commonly generated by winter weather patterns, so pilots in hilly areas can enjoy exciting soaring year-'round.

What if the lift quits?

You glide on to a landing. From 2,000' up (a typical tow release altitude), a sailplane can stay airborne some 10 minutes and travel some 10 miles in the process. With a little planning, it is not too hard to find an airport at which to land. If need be, any number of farm fields can be landed in safely as sailplanes touch down at 40 mph and roll 400', with little tendency to tip over like airplanes. Sailplanes grounded at a distant location are designed to be disassembled and loaded into trailers in a matter of minutes. Some wealthier pilots like to order small retractable "sustainer" engines installed in their machines, with just enough power and range to motor home. Still, having a trailer as part of one's kit provides a portable hangar for storage and a convenient means to relocate the glider at another site.



Two place sailplane landing. Image by Bill Hoadley

How can a glider come down?

With dedicated glidepath controls. Since the 1930s, when gliders were routinely becoming slippery sailplanes (glide ratio over 20:1), it has been standard practice to fit airframes with devices to decrease lift, increase drag, and steepen the glide. Most popular are wing top surface "spoilers", narrow blades that swing out perpendicular to the airflow, but various schemes of dive brakes, flaps, and even drag parachutes have been employed. With the continuously adjustable pull of a cockpit handle, a sailplane gliding at 60 mph and at a shallow 150 feet per minute (fpm) down (40:1) can be turned into a brick dropping at 1,500 fpm (4:1). Enough control to defeat storm currents and land exactly where desired.



Spoilers come out of the wing and create drag for landing. Image by Bill Hoadley

Do you go where the wind takes you?

No, sailplanes usually fly faster than the wind. Accordingly, a flight can be conducted upwind of a home airport almost as easily as downwind. In fact, pilots of lower performance gliders are best advised to stay upwind of the airport at all times as the altitude needed to return to the field is far less.

Can you return to your takeoff site?

Almost all flights do. A typical commercial glider ride of half an hour will roam around the airport a few miles and return to land within a few feet of the takeoff point, ready for the next passenger. Through the 1960s, a tailwind boosted all the longest record and contest cross-country flights and the fashion was to head off followed by a ground crew, like balloon pilots. Given the distances of over 500 miles then achieved and the long return trips, and adding in the energy crisis fuel difficulties of the early 1970s, the fashion has since universally turned to closed-course flights.



Flying free as a bird! Image by Chris Woods

What government oversight is there?

Typically, the same as for light airplanes. In the USA, the Federal Aviation Administration (FAA) sets certification requirements for gliders and their pilots, including annual equipment inspections and pilot currency checks. The NTSB and NASA maintain accident reports.

Do you have to have a pilot's license to fly a glider?

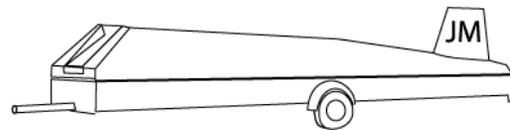
Yes. In the USA, the FAA issues pilot license Certificates in "grades" such as Student, Private, Commercial, Instructor, and aircraft category "ratings" such as Airplane, Glider, Balloon etc. (hang-gliders, Para gliders, and ultra lights are not on the FAA list). Sailplane pilots must hold an FAA Certificate with Glider Rating to fly solo, take passengers, and so on, but they need not fly airplanes as well. There are advantages to learning to fly in a glider first and then going on to airplanes, but glider flight schools actually do as brisk a business in "adding a glider rating" for airplane pilots because airplanes are much better known and accessible to the public.

Are gliders as strong as regular airplanes?

Stronger. In the USA, the FAA certifies Approved Type aircraft into strength categories of "Normal", "Utility" (a little stronger), and "Aerobatic". All gliders are at least "Utility" and many "Aerobatic". With smaller payloads and no engines to support, it is reasonably easy to engineer glider airframes strong.

How do you get them to the airport?

All sailplanes are designed to be disassembled and trailered. The wings and tail are removable and slide securely into a special trailer for the trip to the airport and back home after the days flying.



Sailplanes are designed to be carried by trailer and assembled at the airport

Assembly normally takes a few minutes from start to finish and can be done with two people in most cases. The heaviest part of the sailplane that needs to be lifted during assembly is the wings which typically weigh just over 100 pounds.

Are sailplanes hard to assemble? How long does it take?

Sailplanes only take a few minutes to assemble. The following sequence shows a high performance sailplane being assembled.



Wing comes out of the trailer...



and is put into position...



The other wing is put in place...



The tail goes on and you're ready!

After the sailplane is assembled the pilot carefully checks over all the flight systems in what is referred to as a pre-flight check. The entire process from driving up to the airfield to being ready for launch can take only 30-45 minutes.

How much do they weigh? How big are they? How fast do they fly? How high do they go?

About the same as light airplanes. Sailplanes come in single-seat and two-seater varieties, setting aside a rare two-passenger ride machine or the troop gliders of World War Two. On the average, they weigh 600 lb., span 60 ft., and measure 25 ft. from nose to tail. Typical flight speeds are about 60 mph but can be as high as 160 mph and as low as 30 mph. Altitudes are typically above 1,000 ft., that space being reserved for launch and landing.

Are there accidents?

Of course. Thankfully, and unlike hang-gliding or skiing for that matter, small injuries like broken wrists are unheard of. Many instances of major damage to gliders result in no injury to the pilot or passengers, furthermore. However, fatal accidents can occur, the incidence being less than a dozen per year in the USA out of tens of thousands of participants and hundreds of thousands of flights. The major cause is pilot error, followed by weather extremes. Mid-air collisions are rare, equipment failures are rarer still, and usually due to pilot preparation mistakes rather than structural weakness.

Are there contests?

Yes! The sports national organization, the Soaring Society of America, sanctions both regional and national soaring competitions in the United States. A sailplane competition typically lasts five to ten days, with tasks set each day the weather is suitable.



Each contest features flights from the home airport, around turnpoints, and back to the home field.

Competition soaring is all about speed around a course. Depending on the weather flights of over 300 miles are not uncommon.

In poor weather, the course might be as little as 60 miles; in excellent weather it could be 350 miles or more. Competitive soaring is all about speed, with the fastest pilot around the course receiving the most points for the day. The contest winner is the pilot with the most points at the end of the event. Seconds count and on some days may make the difference between winning and losing.

Regional competitions are held all across the country, typically lasting 5 to 7 days and involving 25 to 50 gliders in several competition classes. National Championships run for 10 days and usually include 50 to 65 competitors. A handful of pilots from the national level are selected to compete internationally at World Soaring Championships on United States teams.

Acknowledgements

Thanks to John H. Campbell for his work on developing this FAQ.

Soaring Related Background Web Sites

www.ssa.org

Soaring Society of America (SSA) home page. The SSA is the national organization responsible for soaring in the United States. Lots of good information on the sport and the organization here.

www.ssa.org/UsTeam/

US Soaring Teams. Organized and funded as part of the SSA the US Soaring Teams Web site features team members, pilot's biographies and much more about the US Soaring Teams.

www.ssa.org/usteam/press

The one stop media press room on soaring brought to you by U.S. soaring teams.

<http://acro.harvard.edu./ssa/>

This site has a host of soaring related information including the turnpoint exchange, flight recordings from contests and all the details of US team selection.

http://www.soarmn.com/soaring_links/index.htm

The excellent soaring link page by Paul Remde who has collected a huge variety of soaring related links. A must visit and four stars.

<http://www.miskin.demon.co.uk/index.htm>

This site gives a very good step by step idea and many references about learning to fly sailplanes.

<http://www.webring.org/hub?ring=soaring&id=64&next5>

This is a soaring web ring that allows you to randomly browse many of the best soaring related web sites

<http://www.glidingmagazine.com>

This site is an online magazine sponsored by the Soaring Society of America.

<http://www.fai.org/>

Fédération Aéronautique Internationale (FAI), the world's air sports federation, was founded in 1905. It is a non-governmental and non-profit making international organization with the basic aim of furthering aeronautical and astronautical activities worldwide. Ever growing, FAI is now an organization of some 90 member countries.

<http://www.fai.org/Gliding/>

The International Gliding Commission (IGC) of the FAI is the Air Sports Commission which is responsible for all air sports activities involving gliders and motor gliders with the exception of glider aerobatics.

Other Soaring and U.S. Team Media Background Available

These resources are available for your use on the United States Soaring Team Press Room which includes press releases, media clippings, background, fact sheets, press images, web links and a championship calendar. See www.ssa.org/usteam/ust_press

United States Soaring Team Press Room

This is your one stop online media resource developed to help you craft a factual and newsworthy story on the exciting sport of soaring and United States Soaring Teams. This media resource is brought to you by the Soaring Society of America and United States Soaring Teams. Some of the resources available in the U.S. Soaring Team Press Room are:

- Soaring Society of America
- Sport of Soaring
- Sailplanes & Gliders
- Competitive Soaring
- Clipping Archive
- U.S. Soaring Teams
- History of the Sport
- Calendar of Events
- Press Releases

Soaring & Gliding Terminology

15-Meter Class	The 15-Meter Class restricts wingspans to 15 meters or 49.2 feet. These sailplanes use flaps and interconnecting control surfaces, water ballast, retractable landing gear to increase performance.
18-Meter Class	The 18-Meter Class is similar to the Open Class except with a wing span restriction to 18-meters or 59 feet.
Aileron	A hinged portion of the wing that provides a banking or rolling force.
Airspeed	The speed of the glider in relation to the air it is flying in.
Aspect Ratio	The ratio between a gliders span and the cord of the wing. Long skinny wings are said to have a high Aspect Ratio.
Bank	To tip or roll around the longitudinal axis of the glider. To bank to turn the glider.
Class	A category of competitive glider established based on wing span performance or pilot characteristics
Contest Director	The head honcho at soaring competitions - the one who calls tasks and is responsible for ensuring that the contest is a safe, fair soaring competition.
Convection	The up and down movement of the atmosphere normally related to thermal action.
Crews	Support personnel who assist the pilot on take off and landing and retrieve the pilot if they land off field. Typically a friend or family member.
Cumulus	A cloud type whose origin is upward moving air. Typically these clouds look like fluffy cotton balls in the sky.
Drag	The force opposing the forward motion of the glider (wind resistance when you stick your hand out the car window).
Elevator	The horizontal movable surface of at the tail used to control pitch
FAA	Federal Aviation Administration is the governing body of civil aviation in the U.S.
FAI	Federation Aeronautique Internationale is the world governing body of aeronautical contests and records.
Feminine Class	Feminine Class is restricted to female pilots.
Fin	The fixed vertical tail surface, used to provide directional stability.
Finish Line	An imaginary line that all competitors must fly through to finish the day's competition.
Flap	Hinged portion of the wing normally toward the fuselage that alters the lift and drag characteristics of the wing
Flight Computer	Sophisticated computer that takes measurements of distance and performance to show the pilot the distance and speed they can glide to reach a point.
Flight Recording	An electronic file that is a recording of the altitude and position of competitors while in flight. Normally generated by a secure recording GPS. Also called a Flight Trace.
Fuselage	The area consisting of the cockpit and tail of the sailplane
G	For gravity, the load on a glider is stated in terms of multiples of the force of gravity. Three "G" would equal three times the load than applied by gravity alone.
Gaggle	A group of sailplanes circling tightly and sharing a thermal to climb in.
Glide Ratio	The ratio of forward to downward motion. Forty five feet forward to one foot down to is called a glider ratio of 45:1
GPS	Global Positioning System. Used by competitors in conjunction with a flight computer and a secure recorder to navigate and make a record of the day's flight.

IGC	The International Gliding Commission (IGC) of the Federation Aeronautique Internationale (FAI) is the Air Sports Commission which is responsible for all air sports activities involving gliders and motor gliders with the exception of glider aerobatics.
Junior Class	Junior class restricted to pilots under the age of 26
Knot	A unit of speed 15% faster than miles per hour
Land Out	Landing someplace other than the contest airport sometimes in a farmers field.
Lenticular Cloud	The characteristic cloud of lee waves normally found downwind of mountains
Max L/D	The maximum performance of a sailplane normally expressed as Lift over Drag.
Nationals	An event sanctioned by the Soaring Society of America for a single class of glider. Establishes the US national champion for that class and is used to select the U.S. Soaring Team.
Open Class	With Open Class sailplanes anything goes so wingspans can be up to 90 feet in length allowing these marvels to travel 60 feet forward to one foot down for a glide ratio of 60:1.
Pitot Tube	An open-ended tube that faces toward the front of the glider that measures the impact air pressure for airspeed.
Radio	Aviation band 720 radio. Contestants use 123.3 and 123.5 for competitions.
Rain Day	A day that no contest is held normally due to weather
Red Line	A warning mark on the airspeed indicator that corresponds to the maximum airspeed for the glider.
Regional	A Soaring Society of America sanctioned a relatively local competition in one of the twelve regions in the U.S. with several classes.
Rudder	The hinged vertical control surface used to induce or overcome yawing
Sailplane	A motor less craft that can climb using atmospheric forces alone. Referred to interchangeably as a glider.
Score Sheet	The daily tally of the competitors ranked by points and standing
Shot Down	Unable to stay aloft. Implies the weather rather than the pilot was a fault.
Sink	Descending air currents
Soar	To fly without power from and engine without loss of altitude.
Span	The maximum distance between wingtips.
Spoiler	Devices that disturb the airflow across the wings and create drag. Normally used for landing.
Sports Class	The Sports Class was developed to give older, lower performance sailplanes a fair competition using handicapping.
SSA	Soaring Society of America – The national organization responsible for soaring in the United States.
Standard Class	The Standard Class are similar to the 15-Meter sailplanes except without interconnecting control surfaces or flaps.
Start	An imaginary cylinder or “beer can” from which competitors must exit to begin the race on any contest day. Also called the Start Cylinder
Task	The day’s competition course, normally including several turnpoints, around which competitors must fly on any given contest day. There is a different task chosen by the Contest Director each day and is weather dependent.
Thermaling	Turning in tight circles to keep the sailplane inside the column of rising air.
Thermals	Raising columns of warm air that allow sailplanes to gain altitude

Turnpoint	A point that is designated by contest organizers that contestants must navigate to complete a task.
Variometer	Sensitive rate of climb indicator that allows competitors to climb efficiently in thermals.
Water Ballast	Water put in the wings of the sailplanes to improve high speed performance.
World Class	The World Class is the one design class in which all gliders are restricted to a single design.
Yaw String	A few inches of yarn on the front of the canopy indicating slip of skid.