ANOKA COUNTY-BLAINE AIRPORT BLAINE AIRPORT PROMOTION GROUP TOURS AVALIBLE K-12

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SPORTS GLIDERS have three basic forces that influence flight. The wings need to be designed to produce enough *lift* to compensate for the weight of the glider and can develop greater lift as the glider gains speed. As the glider gains speed, *drag* also increases. The glider has no engine to produce thrust so *gravity* is used by flying at a sharply downward angle trading altitude for speed. Altitude becomes the source of the thrust to power the glider.

GLIDE RATIO

A glider design has what is called a glide ratio that tells how far in a horizontal distance a glider can fly compared to the drop in altitude, so a glide ratio of 60:1 would indicate that a pilot might glide for 60 miles if started at an altitude of 1 mile.

DRAG REDUCTION

The reduction of drag is the most important design objective in increasing the glide ratio. Gliders have wings that are very long in comparison to the width (chord), meaning they have a high aspect ratio and will produce very little drag for the amount of lift they produce. The outer skin is made of a smooth fiberglass or carbon composite that eliminate the need for rivets or seams that would cause drag. Gliders are made as small and light as possible to accomidate one or two people with a small frontal area to reduce drag.

LAUNCHING AND SOARING TECHNIQUES

Aero-tow planes are used to launch and obtain high altitude for the glider pilot to begin a soaring flight. Pilots of gliders and the powered aircraft are required to follow federal air regulations governing flight. In the 1920s glider pilots found that they could stay aloft to obtain longer flights by using updrafts caused by wind blowing against hillsides and valleys near their launch sites. Meteorologists soon discovered and began to understand mountain waves produced by the warmth of the sun on mountain surfaces. These discoveries lead glider pilots to make the first high altitude flights using the updraft of warm moist thermals along a variety of land features that help to form clouds and provide lift for the glider.

WEATHER AND FLIGHT PLAN

A glider pilot will determine if weather conditions are safe for soaring and will plan a flight according to local conditions and planned destination. A glider is powered by gravity so altitude is a controlling factor in the flight plan. Pilots must locate thermals that rise faster than the sink rate of the glider. The success of the flight will be determained by the ability of the pilot to locate thermals, entering and leaving thermals and judging which clouds have the best chance of providing the next uplifting thermal.

CROSS COUNTRY SOARING

Crossing over terrain beyond the local soaring site will require greater preperation and experience in navigational techneques. A pilot will need to check weather in the area of the proposed course of flight to determine how good thermals are and what the prediction will be for continued activity over the planed course. Checking for landing possibilities and airports faverable to prevailing wind conditions is important as well as consideration for the effect headwind may have during the flight. Speed between thermals plays a part in the successful flight. A ballast tank can be used to increase speed to improve lift during transitions between thermals and can be emptied prior to landing. A Sectional Aeronautical Chart containes general information about topography, roads and highways, lakes, cities, private and public airports, restricted and warning areas, and boundries and limited vertical restrictions for different classes of airspace.

Learning about termals and structure of cloud formations and how to identify when a cloud is likely to begin losing lift capabilities is essential in successful soaring. The nature of thermals is a combination of sun, producing heat that is distributed unequally on the earth and wind currents that work to equalize the atmosphere. Updrafts and downdrafts are the vertical winds that make soaring possible. The glider pilot wants to maximize time in the updraft as long as possible.