Going UP in a Parachute

A powered-parachute manual and source book for the beginner

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TABLE OF CONTENTS

IMPORTANT!
Safety Rules and Disclaimer

Life is not safe. In fact living is the most dangerous thing you can do. If you are born you will one day die. But if you are careful, you can pack a lot of living into your life.

Keep in mind that even though powered parachuting (powerchuting) is probably the safest form of personal flying, you are still high up in the air and a mistake can cause injury or even death.

Whenever a person leaves the ground, he or she risks serious injury or death. Whether to accept or reject this risk and its accompanying challenge must be a personal decision; one must weigh the risk and the reward.

This is not a do-it-yourself text. The information contained here is intended as an introduction to this sport and as a source of reference. After reading this book, contact the firms listed herein for further information and instruction. This book is designed to provide accurate information in regard to the subject matter covered. It is not the purpose of this manual to reprint all the information that is otherwise available. For more information, please refer to the sources given in this book. The purpose of this manual is to educate and entertain. Every effort has been made to make this book as complete and as accurate as possible. However, there may be mistakes both typographical and in content. Therefore, this text should be used only as a general guide and not as the ultimate source of powered parachute information. Furthermore, this manual contains information only up to the printing date. EasyUp warrants this book to be free of defects in materials

and workmanship. This warranty shall be in lieu of any other warranty, express or implied. Application of information or procedures derived from this book is not within control of the author, therefore, liability for use of this information is hereby disclaimed by the author and publisher.

The author and publishing company shall have neither liability for, nor responsibility to, any person or entity with respect to any loss or damage caused or alleged to be caused directly or indirectly by the information contained in this book. **IF YOU DO NOT AGREE WITH THE ABOVE YOU MAY RETURN THIS BOOK TO THE PUBLISHER WITHIN 30 DAYS OF RECEIPT OF BOOK FOR A FULL REFUND.**

Aviation can be pretty safe if you work at it. With that in mind here are some guidelines you should think about and follow every time you fly:

1. **Never fly under the influence of drugs (including alcohol).**
2. **Never fly when overly tired.**
3. **Never fly when you are emotionally distressed.**
4. **Never fly alone.**
5. **Always wear a helmet.**
6. **Always take off and land into the wind.**
7. **Deflate your canopy immediately after landing.**
8. **Never, ever fly to show off. Not for a camera, family, friends or anyone.**
9. **Only fly if you feel it is safe, not if someone else says it is.**
10. **Do lots of research before you fly. Ask the experts.**

11. Take it slow. Learn new things one at a time. If something doesn't feel comfortable, don't do it.

12. Never add more than one new thing at a time (new glider, new site, new motor, new propeller, etc.).

13. The wind complicates all flying — the stronger the wind, the greater the complications.

14. Judgment takes the longest time to acquire of any aspect in aviation.

15. Always fly one step *below* your limits.

INTRODUCTION

Now that you have just finished reading the scarey stuff (you did read the *IMPORTANT* Safety Rules and Disclaimer didn't you?) we can start on the good stuff.

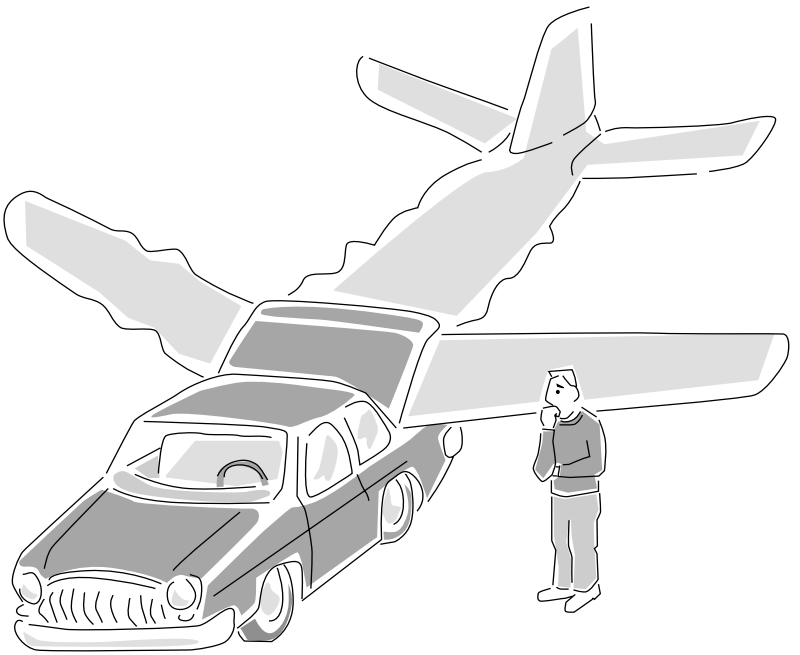
Have you ever wanted to fly? I mean to really fly, not in an airplane, but rather to just strap something to your back and zoom off over the treetops and on up to 1,000 feet to see your house, neighborhood and the world as you have never seen it before? It is a wonderful, exciting experience you will never forget.

At first there is often a natural fear of heights, but this is quickly and easily overcome allowing anyone to experience all the wonderful adventures of personal flight and to safely enjoy this phenomenal, natural high. It is an adventure that will expand your mind as well as your horizons.

This book is written with the *complete* novice in mind, but whether you are a beginner or an expert I am sure this book will be of great use to you as you explore the field of powerchuting.

It will allow you to intelligently and knowledgeably decide if this is for you and exactly how you want to go about getting into the air. With that in mind, let me congratulate you on your decision to go for your dreams. Your decision to buy this book was a wise first step. When you have read this book cover-to-cover you will know more about powered parachuting than just about everybody you know.

Welcome to the wonderful world of powered parachuting (powerchuting) and the freedom of easy flying!



Chapter 1

Why powered parachutes are wonderful!

I think that powered parachutes are wonderful (obviously, since I wrote this book), so I think telling you why I think so as the first chapter is only fair since they are the cheapest, easiest, quickest, safest, most fun way to fly. Powered parachutes are the safest form of flying there is. I don't know of any fatality ever caused by flying one and I want to keep it that way.

Before you ever get off the ground you are already under an open, inflated parachute which is inherently stable. If the engine ever quits you can still safely land a powered parachute just about anywhere. I will tell you more about this aspect of powerchuting later on in the book. Powered parachutes are so simple that there is really very little that can go wrong with them mechanically.

Powered parachutes are the

cheapest aircraft in the world to purchase, own, fly, store and maintain. The purchase price of a powered parachute can range anywhere from $15,000 for a two-seater go-cart model to under $900 for a back-pack style craft that you build yourself from plans. Powered parachutes are inexpensive to fly, because they are considered ultralights and are not required to have licensing, registration or insurance. You are not required to be licensed in any way whatsoever to fly a powered parachute.

Anyone who has tried to store anything, let alone an aircraft, knows how difficult it can be. An aircraft takes up a lot of space! If you must store an aircraft away from your home you will quickly find that space rent is expensive, and that you don't fly it very often. Most backpack-powered parachutes and even some go-cart style powered parachutes can be quickly disassembled to fit in any closet. Some backpack style craft are as near to maintenance-free as an aircraft can get, because they are such simple, uncomplicated aircraft. Add these things together and you get a lot for your dollar.

The backpack models can weigh less than 40 pounds and some can pack down to just slightly smaller than a suitcase. You can take them anywhere in the trunk of your car. Fly over a friend or relative's house. You can take it to the beach or a private campsite and enjoy all the majesty of nature from a totally new vantage. You can even take one on an airline as luggage and fly anywhere in the world!

A person can learn to fly a powered parachute very quickly, easily and inexpensively. It takes under one hour of instruction for a person to learn to fly nearly any of the go-cart style parachute craft solo (by themselves).

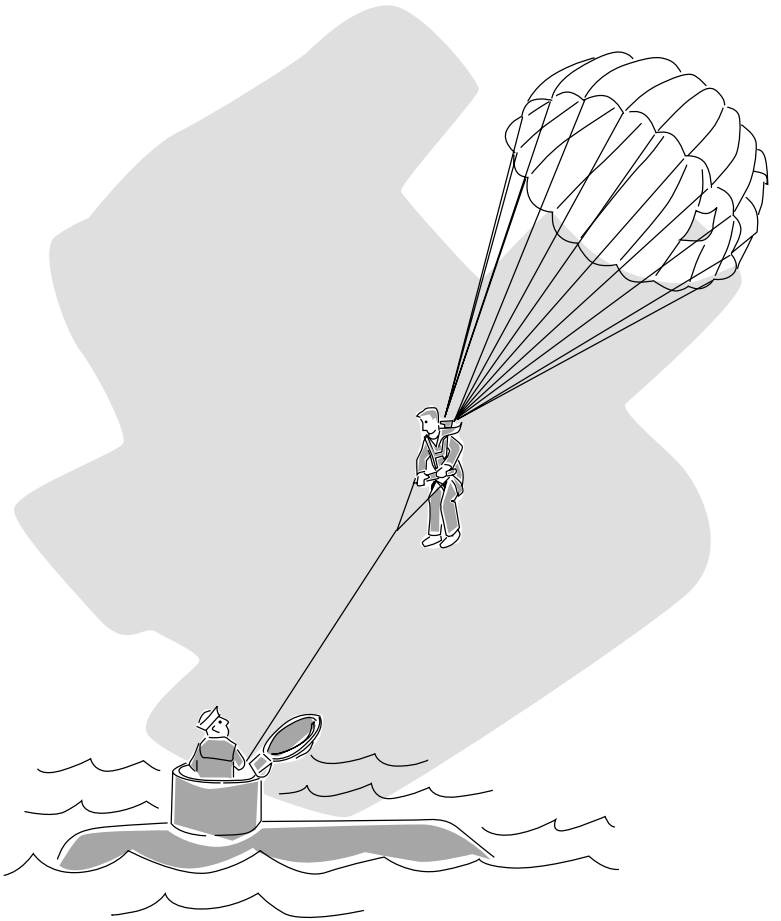
A person can learn to fly his or her own backpack style powered parachute in one weekend. They are so easy to fly because they have pendular stability so they have no controls to coordinate and no pitch control to worry about.

Powered parachutes can take off and land from a much smaller area than most flying machines. The go-cart models need a field for both takeoff and landing but the backpack powered models can take off while running a few short steps, and land on a dime.

Leonardo Da Vinci said: "Why fly? For once you have tested flight you will walk the earth with your eyes turned skyward; For there you have been, And there you long to return." Even though Da Vinci never realized his dreams of flight we can now realize ours.

With powered parachuting we prove Da Vinci's words true. We have the most inexpensive, convenient and easiest way to fly available. We can purchase new equipment for one-half to one-hundredth the cost of other sport oriented aircraft, and we can be flying after just a few days training rather than the weeks and months that other forms of aviation require.

Powered parachutes are opening up aerial recreation to thousands of people who could not otherwise enjoy the freedom of flying just for fun.



Chapter 2

A brief history of powered parachutes

Even though the idea of parachuting has been around since the14th century, it took a while before anyone developed it to the paragliding stage. As with many forms of aviation it was first used for its military applications.

In World War I many technological weapons were just developing, including submarines. Unfortunately, these new subs had none of the sophisticated electronics we have today, and the fact that they had to maintain a low profile made observation very difficult.

What to do? The technique of towing some brave sailor and his parachute aloft, behind the submarine was developed as a sort of glorified "crow's nest". After the first World War people in Germany and Holland began the practice of "towing" on land for the fun of it, however the advent of World War II put an end to that.

But after the nightmare of another world war was ended, there were many abandoned airbases in both Europe and the United States which quickly became ideal sights for parascending, and the sport spread. The round chutes being used were far from ideal though. They were not very controllable.

In the late 1950s Pioneer Parachute Corporation, developed the Paracommander. The Paracommander revolutionized sport-parachute towing as well as jumping, it would glide farther and was easier to control.

The next step was introduced by the National Aeronautics and Space Administration (NASA). While experimenting with rocket recovery devices they designed several controllable parachutes including Rogallo wings which later evolved into hang gliders, and ram-air parachutes which have become the most common type of jumpchute today.

Towing ram-air parachutes became a passion with a group called the British Association of Parascending (BAPC). In the early 1970s, they called what they did "parascending" because the object was to be towed up — to ascend.

A few brave souls started disconnecting from their tow lines and floating back to earth to try their luck at spot landing. The problem with the ram-air chutes, or "squares" was that they dropped relatively fast and collisions with the ground would result in ankle injuries.

In 1983 Steve Snyder incorporated the ram-air wing into an ultralight plane, named the Paraplane, using two 15-horsepower engines to create the worlds first practical flexible wing aircraft. The go-cart models used today are essentially similar if not the same as the original Paraplane.

Two Englishmen, John Harbot and Andrew Crowley were manufacturing square parachutes when they heard of a few extreme experimenters attempting foot launches from a slope. They started experimenting with ways to help, finding that larger sizes and different materials contributed greatly in their effort to solve control and landing problems.

John Harbot later became one of the first test pilots in paragliding. He then became one of the first manufacturers and one of the first instructors.

Soon people were experimenting with any slope they could find. By the mid-1980s paragliding really took off. Today we have schools and clubs to help an individual learn how to paraglide, without having to learn the way the pioneers in the field did, the hard way — by trial and error.

People started taking their chutes with them everywhere, climbers have packed canopies up Mount Everest and glided down again.

People began to think of other applications for a flexible "wing." It was only a matter of time before someone put the engine on their back, and used this new and more advanced canopy to take off into the sky! Backpack powered parachuting has become extremely popular in Japan and Europe. It is now taking off in the USA.

Chapter 3

The components of a powered parachute OR What is this stuff?

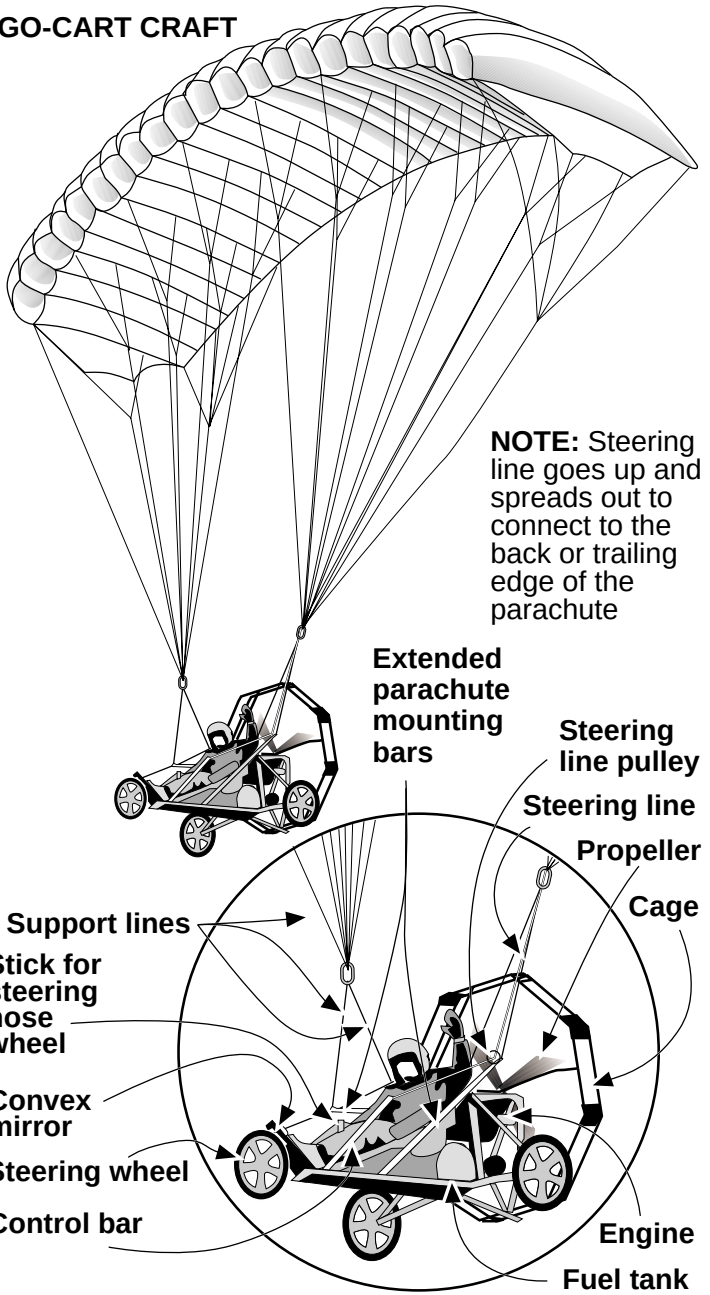
This chapter will discuss what parts make up an average powered parachute as well some of the terms used.

Most of the go-cart styled powered parachutes are very similar so this description will be accurate for most of them. **(SEE ILLUSTRATION 1.)**

The go-cart styled craft has three wheels; two in the rear and a steerable wheel up front. Steering is controlled by a stick, an experienced pilot has to remember to ignore the stick when in the air because it controls only the front wheel. Steering the craft while in the air is done with the pilot's feet by pressing on bars that are connected at one end to the frame by hinges and at the other to steering

ILLUSTRATION 1

GO-CART CRAFT



lines. We will call these "control bars." When the pilot pushes the bar forward, it pulls the steering line through a pulley near the pilot's shoulder to the trailing edge of the canopy.

The parachute's support lines are mounted slightly behind, but out to the sides of the pilot, on aluminum extension bars.

The engine is placed just behind the pilot's seat. The fuel tank is mounted directly below the engine and behind the seat. The propeller is mounted to the rear of the engine and is surrounded by a cage of aluminum tubes.

The throttle and kill switches are mounted in different places within reach of the pilot on different craft. Some craft have a small convex mirror just in front of the pilot, this mirror is to make it easier to check your canopy during take off. Some people forego the mirror and just tilt their heads to see the canopy, because they say that the sun often reflects off the mirror into their eyes.

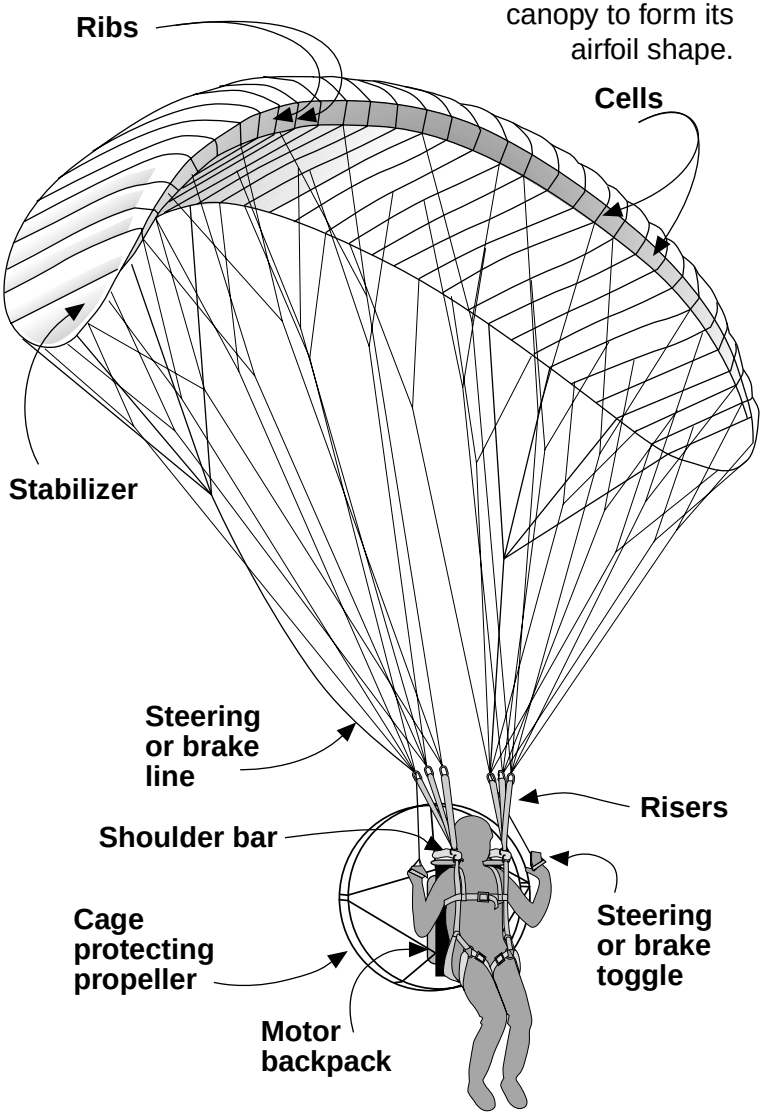
A typical backpack powered parachute consists of four main components; the paraglider, the harness, the backpack motor assembly and you. **(SEE ILLUSTRATION 2.)**

The first component, the paraglider, consists of a canopy, support lines, and steering lines. Paraglider canopies come in many styles and sizes to carry different weights and have different flight characteristics. The canopy is essentially an airfoil made out of a flexible material, usually Dacron® or nylon, that becomes stiff and forms into the proper aerodynamic shape when subjected to an air flow. The canopy is made up of cells or ribs that run from front to back. Several of these cells are placed side by side

ILLUSTRATION 2

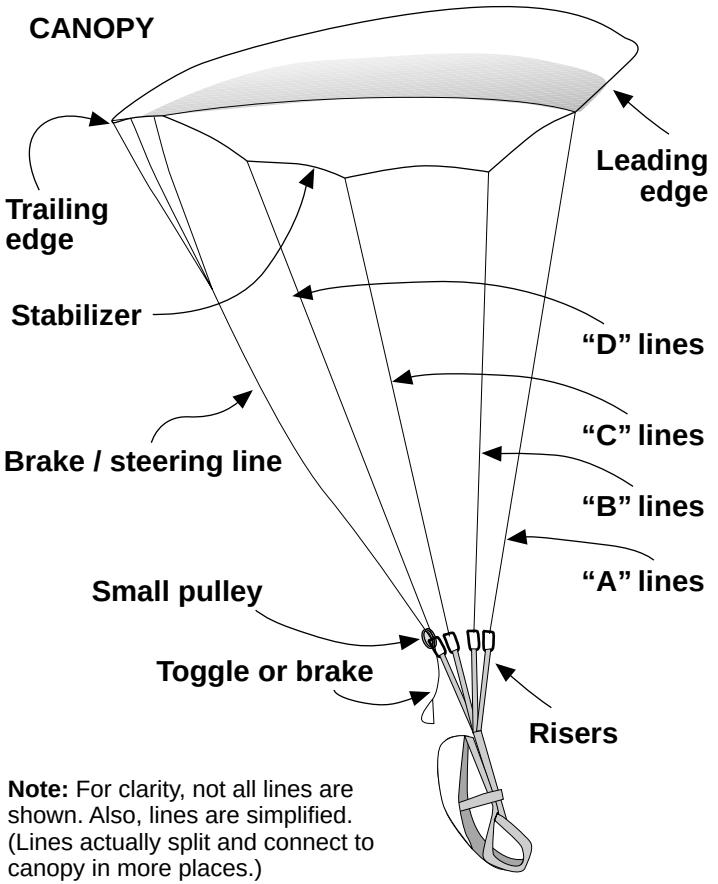
BACKPACK MOTOR CRAFT

Canopy has holes in the front. Air is forced into the holes and inflates the cells causing the canopy to form its airfoil shape.



NOTE: For clarity, support lines are simplified (fewer than actual are shown), and parachute and person are not in scale. Parachute actual relative size is approximately 150% of size shown.

ILLUSTRATION 3



and make up the total area of the canopy.

There are several sets of support lines. Lines are made of Dacron®, Kevlar® or Spectra®. The front set is the 'A' lines, the second set is the 'B' lines, the third 'C' and so on. A typical modern paraglider will have three or four sets of lines, the steering lines run from the trailing edge or back of the paraglider canopy down through a small pulley attached to the pilot's

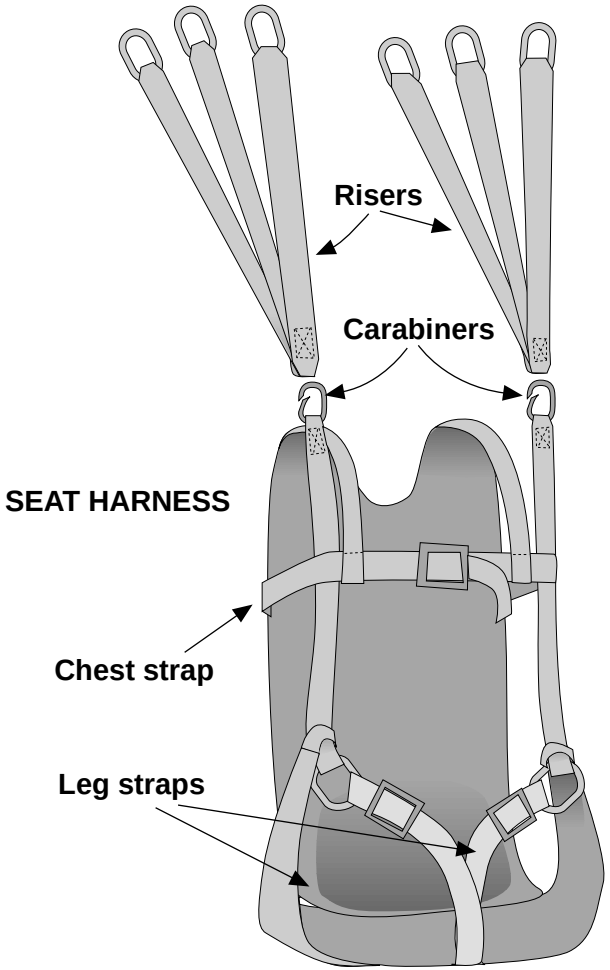
last set of lines (usually 'C' or 'D' lines) down to a handle which is called a steering or brake toggle. Sometimes called a brake for short. **(SEE ILLUSTRATIONS 2 AND 3.)**

The second component is the harness. There are several types of paragliding harnesses. Harnesses are usually made of nylon or Dacron®. The seat harness is generally considered the best for powered parachuting so this is the one we will describe and be referring to through out the rest of this book. The seat harness can be put on and taken off in five to ten seconds.

The seat harness is basically a seat made of flexible material that has straps in the front to support and hold the pilot. The paraglider canopy connects to the seat harness in front on the right and left sides. When flying you lean back comfortably against the back of the harness. During takeoff and after landing the bottom portion of the seat sits against the lower half of your back and bottom, comfortably out of the way of your legs. Just after take off the leg straps hold you in until you scootch or wriggle into the seat. Just before landing you wriggle out of the seat and extend your landing gear (your feet). **(SEE ILLUSTRATION 4.)**

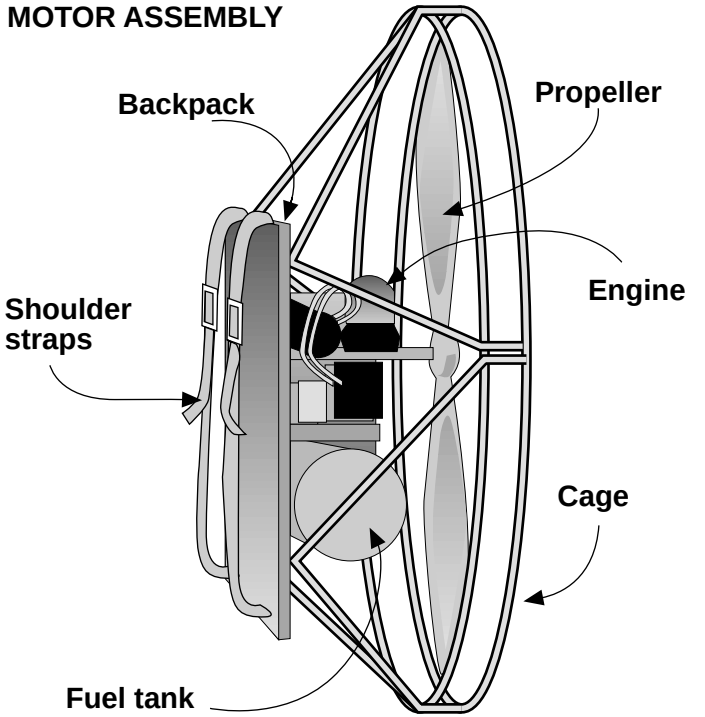
The third component, the backpack motor assembly, is similar to a typical frame style backpack. It is made of high grade aluminum. There are several different designs with several different advantages, but they are basically similar. The engine is mounted squarely in the center on back. Several types of two-stroke engines are being used for this type of craft. There is a large range of weights and horsepowers that can be used to accommodate any size person. The propeller is mounted directly behind the engine.

ILLUSTRATION 4



There are several different types of propellers being used with this type of craft today. From the most simple and inexpensive two-bladed wood propeller to a multi-blade composite propeller. There is a light weight aluminum cage surrounding the propeller and engine assembly, both to keep the lines out of the propeller during takeoff and for safety. The fuel

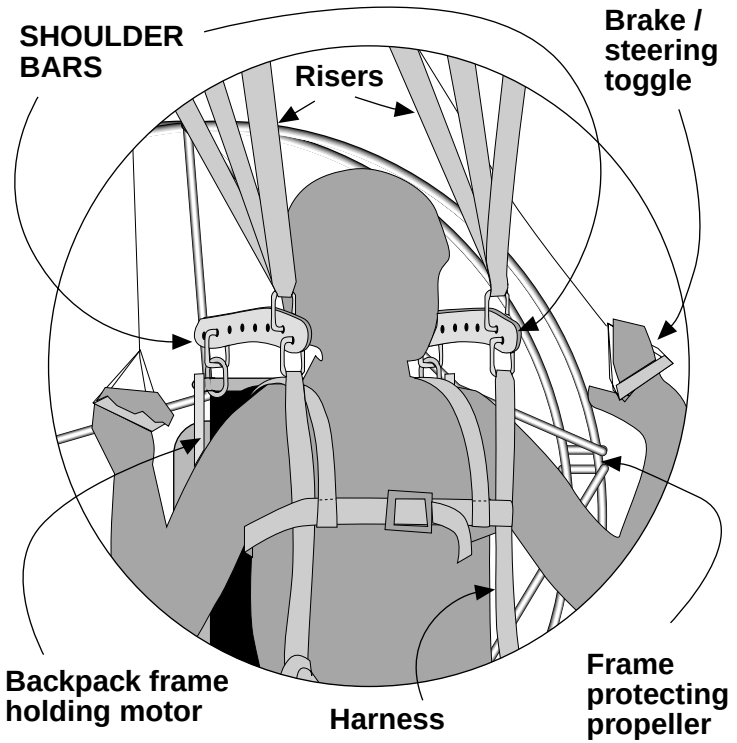
ILLUSTRATION 5



tank is usually mounted below the engine. The throttle is run via a cable from the carburetor to the hand or mouth of the pilot. **(SEE ILLUSTRATION 5.)**

The backpack motor assembly is connected to a bar that is connected to the canopy in the center and connected to the harness in front. When the canopy lifts you off the ground it lifts you up via that bar. We will call it the shoulder bar. With some styles of backpack motor assemblies the shoulder bar is permanently attached to the frame of the assembly and often considered just part of the backpack assembly.

ILLUSTRATION 6



When the canopy lifts you up via the shoulder bar it lifts the weight of the engine off your back at the other end like a balance. When you are flying there is no weight on your back at all. **(SEE ILLUSTRATION 6.)**

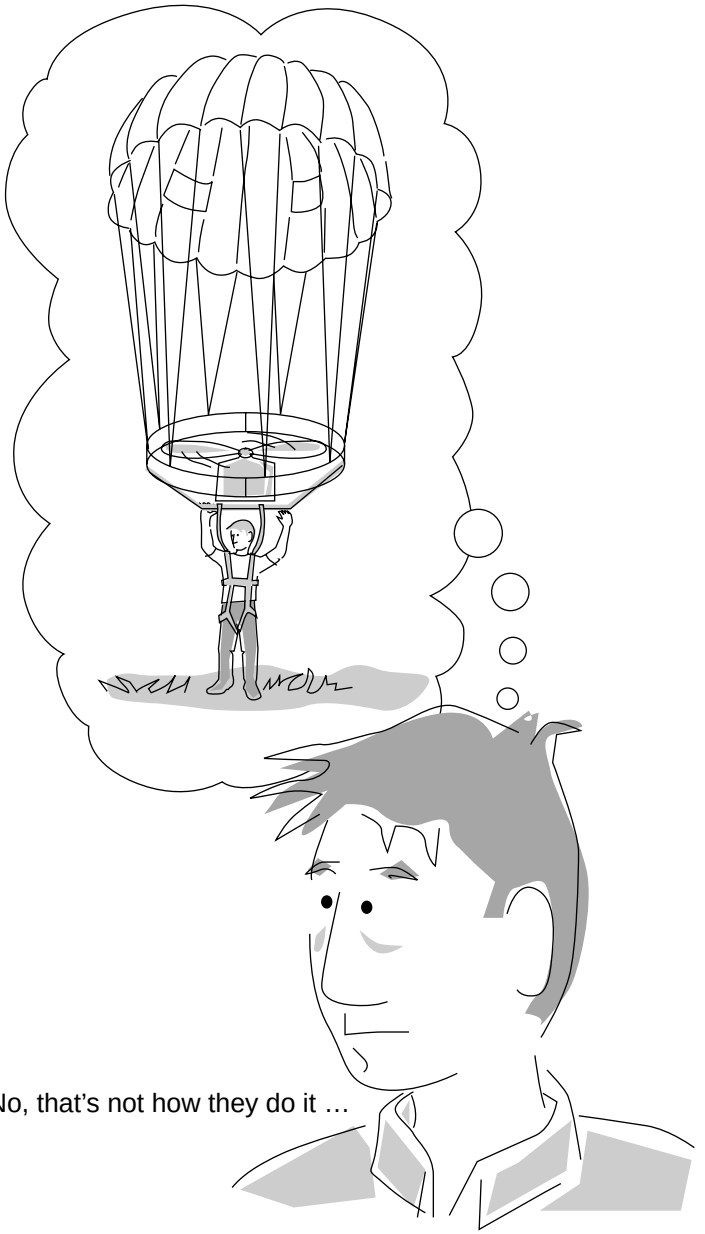
The last of the four components is you or the pilot (a person made mostly of water and carbon). The pilot puts on the harness. The pilot then puts the backpack motor assembly on (like a normal backpack). Hooks the front end of the shoulder bar to the harness and the rear of the shoulder bar to the motor assembly. (Unless it is already attached.) Then the

ILLUSTRATION 7

Great landing gear!

Motor assembly "Paraprotor" built from plans offered on page 93.

pilot attaches the paraglider to the center of the shoulder bar. The pilot controls the aircraft via the toggles and the throttle. The pilot provides landing gear in the form of feet. **(SEE ILLUSTRATION 7.)**



No, that's not how they do it …

Chapter 4

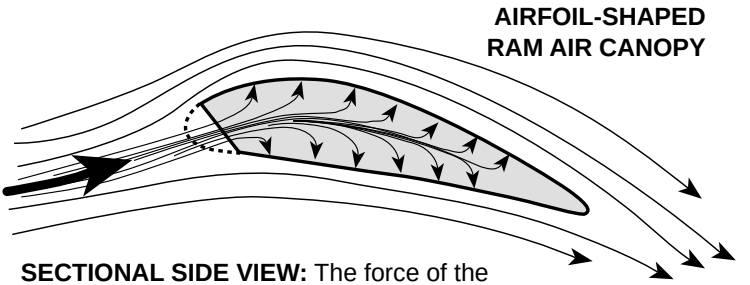
How they fly *OR* How the heck does a parachute go *UP?*

A ram air chute does not just scoop air like a round parachute. There are holes or openings in the front portion of any ram air chute. When the canopy moves forward air is rammed into the openings, inflating the chute and causing the canopy to form into the shape of a wing. **(SEE ILLUSTRATION 8.)**

When the inflated canopy travels forward through the air it flies just like an airplane wing, deriving lift from its airfoil shape. An airfoil derives about two-thirds of its lift from the upper surface and about one third from the lower surface. It derives lift from deflecting air downward. **(SEE ILLUSTRATION 9.)**

Depending on the way they are designed and manufactured, different ram air chutes will have different flight characteristics. Paragliding

ILLUSTRATION 8



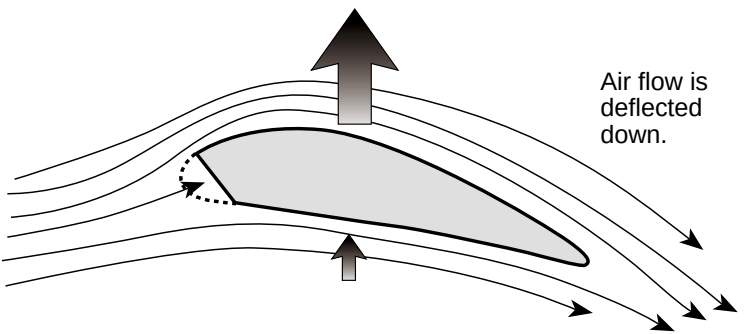
SECTIONAL SIDE VIEW: The force of the moving air keeps the cells in the "body" of the canopy inflated.

chutes are the most efficient of the ram air canopies because they are designed specifically for flying and not for the sudden opening shock that a jump chute must undergo. Paragliders have the highest glide ratios of any of the ram air canopies. **(SEE ILLUSTRATION 10.)**

Like an airplane wing, a ram air chute is affected by its angle of attack or the angle at which it travels through the air. **(SEE ILLUSTRATION 11.)**

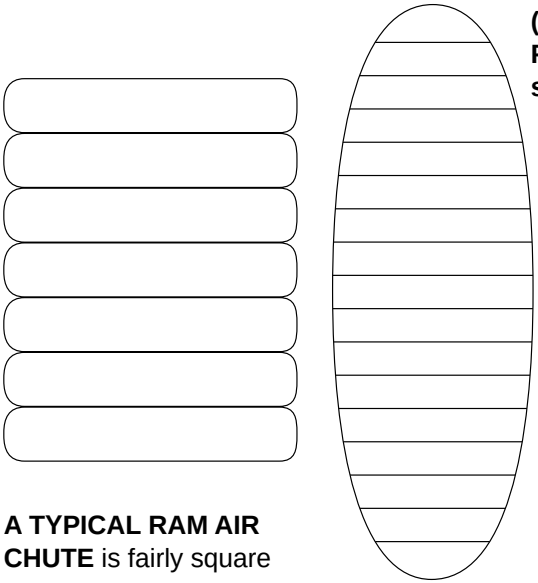
Too high an angle will give the chute a tendency to stall. A stall is when the air is pulled away from the upper surface of the airfoil and the craft slows down quickly and drops due to the sudden loss of its lift. Too low an

ILLUSTRATION 9



SIDE VIEW: Most lift is derived from the upper surface of the wing-shaped canopy (as it is with any airfoil).

ILLUSTRATION 10



(BOTH VIEWED FROM ABOVE, simplified)

A TYPICAL RAM AIR CHUTE is fairly square

A PARAGLIDER is more eliptical, and elongated. It has more surface area, and more lift.

angle of attack will give the chute a tendency to dive. **(SEE ILLUSTRATION 12.)**

Fortunately the designer and manufacturer have set the correct angle of attack into the chute by accurately adjusting the length of the lines. The support lines to

ILLUSTRATION 11

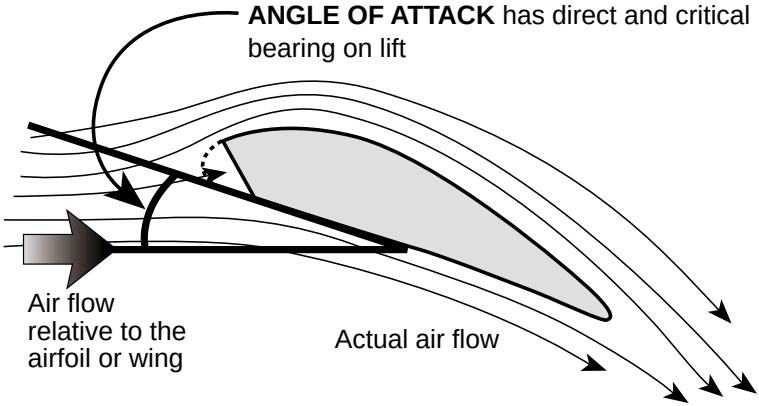
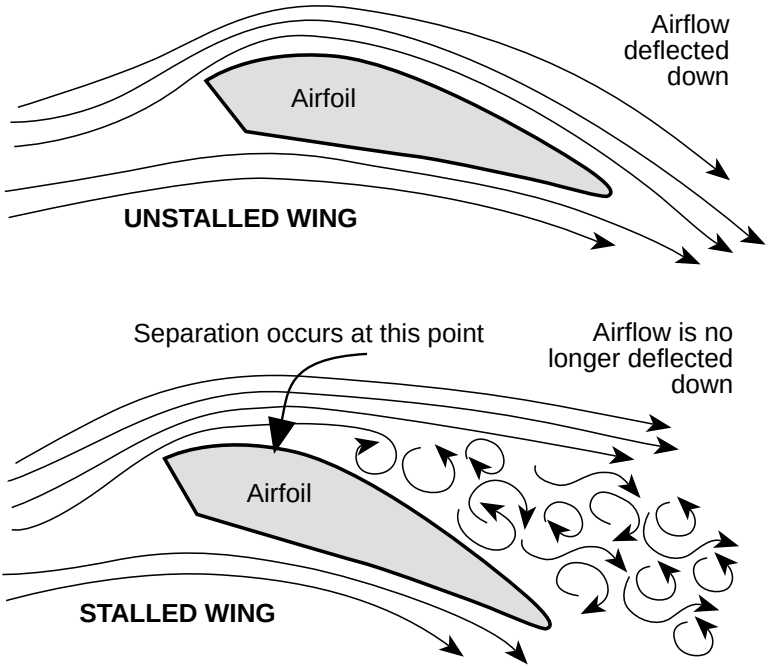


ILLUSTRATION 12



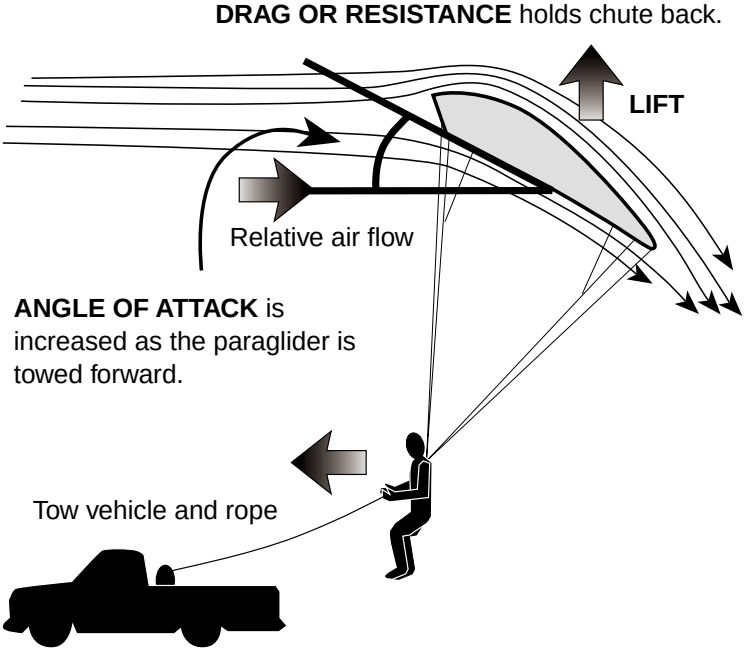
the canopy should not be altered.

You can lower your angle of attack somewhat by pulling on your front lines thus lowering the front of the canopy. You can raise your angle of attack by pulling on your toggles or brakes thus lowering the rear of the canopy.

Some paragliders actually come with an attachment for a speed bar. This is a device that allows a person to change the canopy's angle of attack directly via the support lines, thus changing the speed and flight characteristics of the craft. A ram air chute has a limited range of usable angle of attack and the limits of that range should be respected.

A ram air canopy that is being towed or that is using a motor is easier to stall because the engine or tow rope

ILLUSTRATION 13



pulls the chute into a higher angle of attack even before you pull on the toggles. **(SEE ILLUSTRATION 13.)**

Some canopies have much less of a tendency to stall than others. Although it is easier to stall a ram air canopy with an engine than one without an engine.

Due to the pendular stability (the tendency of gravity to pull you back to straight under the canopy) stalling is not generally a problem with powered parachutes because you have to pull both toggles down and hold them there to cause a stall. So to avoid a stall simply do not pull both toggles down past your shoulders and hold them there. **(SEE ILLUSTRATION 14.)**

The engine and propeller on a powered parachute both increases the angle of attack and maintains the air

ILLUSTRATION 14

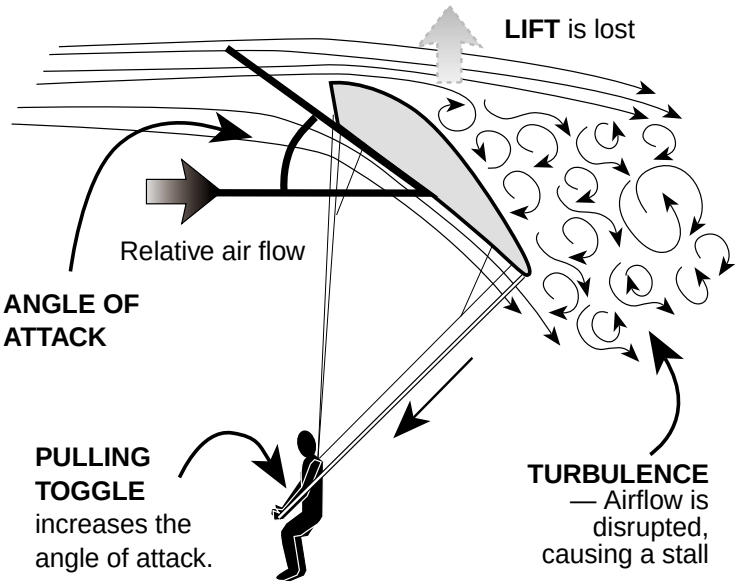
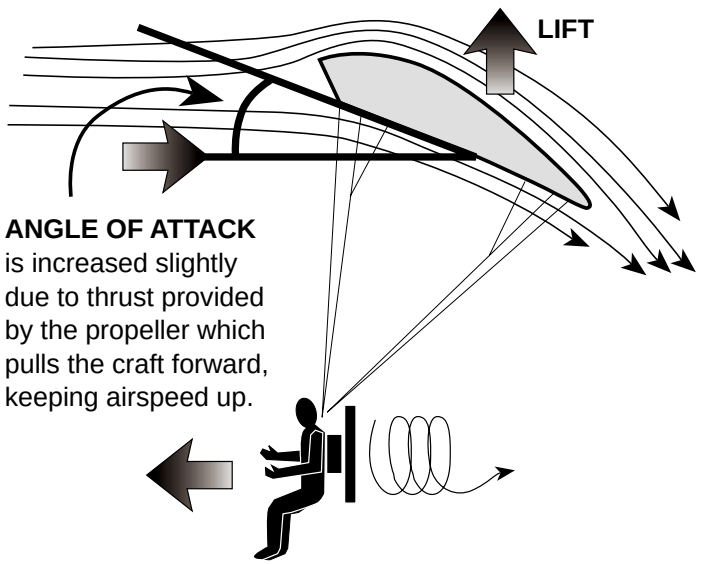
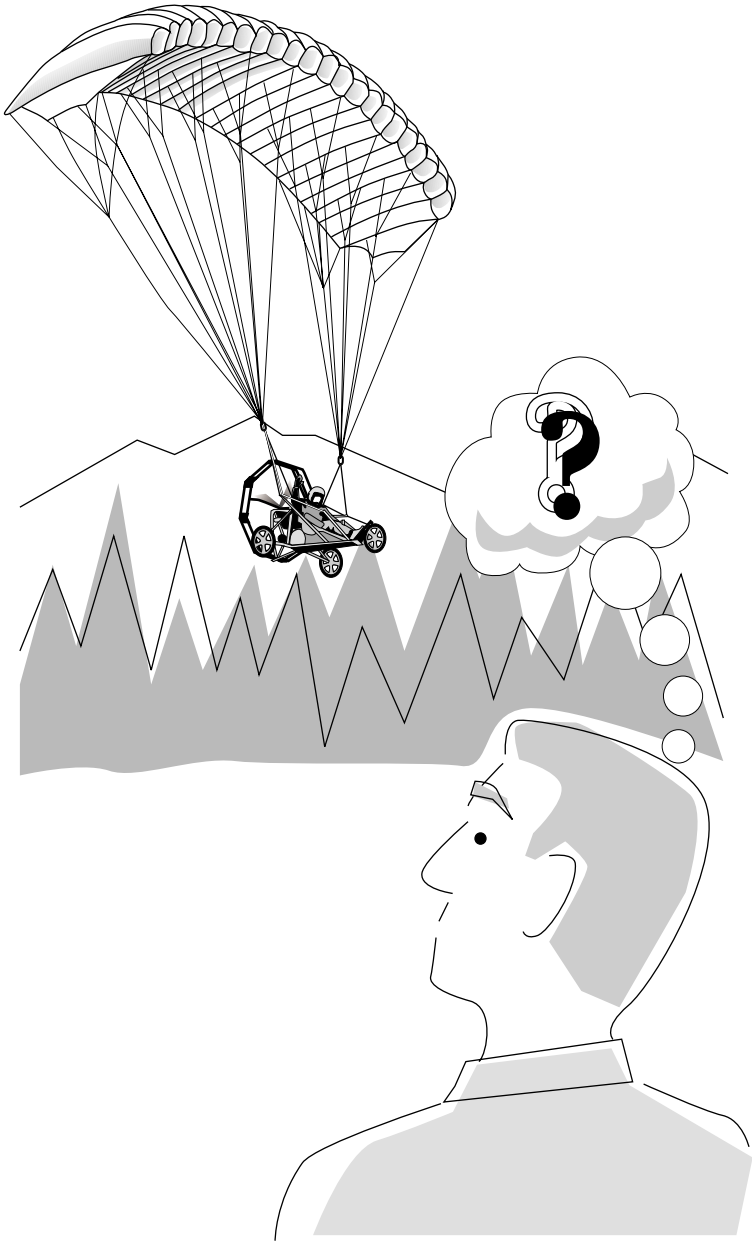


ILLUSTRATION 15



speed of the canopy. The canopy being an airfoil, as shown, then provides lift which pulls the pilot and motor up at a gradual angle. And that is how a parachute can fly up. **(SEE ILLUSTRATION 15.)**



Chapter 5

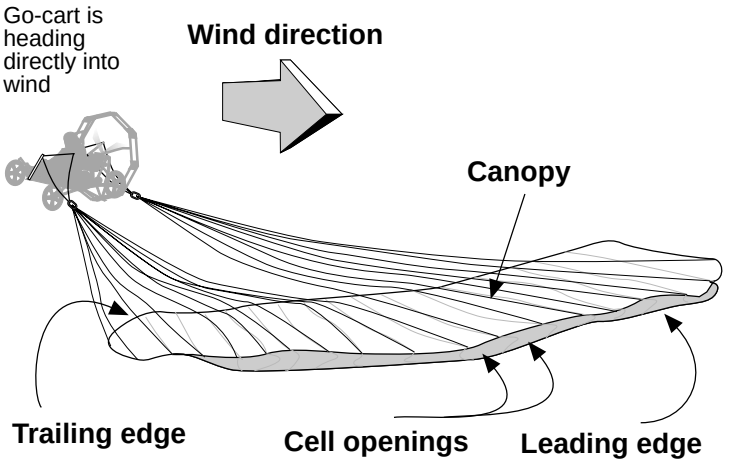
How do you fly one of those anyway? *OR* Can they take off from level ground?

That seems to be the most commonly asked question, and the answer is: *Yes*. Yes, a person can take off from level ground without help in a powered parachute. It is actually a fairly simple matter.

Although we at EasyUp have plans for a backpack styled powered parachute, we believe that the only way to get a go-cart styled powered parachute is to purchase one used or from a dealer. When you purchase a go-cart style powered parachute you will most likely receive a brief (one hour or so) training course. If you buy one used, you need to find a dealer to give you this course. With that in mind, this is a basic description of what you will be learning. To take off in a go-cart styled powered para-

ILLUSTRATION 16

GO-CART CRAFT GETTING READY FOR TAKEOFF



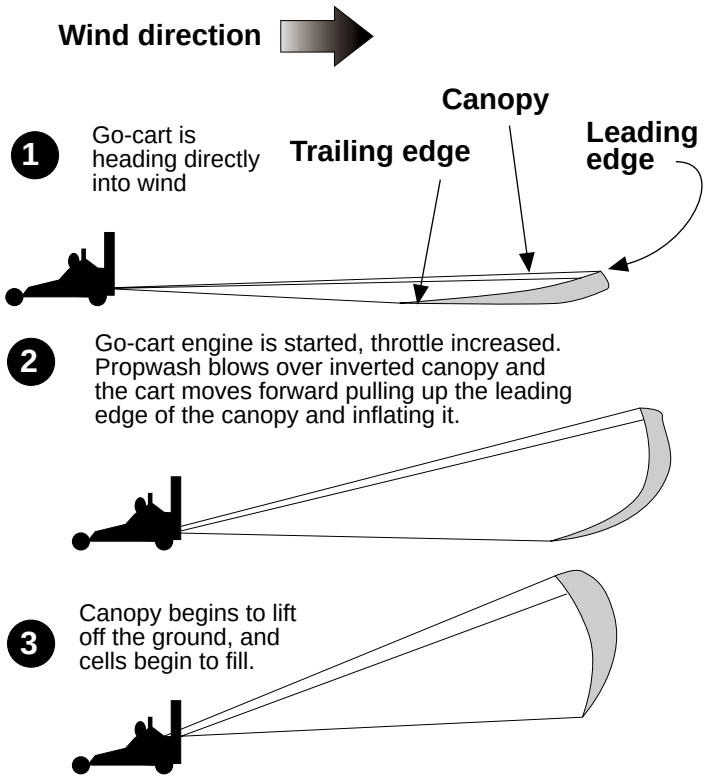
chute you need a medium-sized field free of large upwind obstructions, light -and-steady to no-wind conditions. Different models have different take off distances.

You, the pilot, must assemble the aircraft as necessary and lay out the canopy behind the craft. The canopy will be laid on the ground basically upside down with the lines on top of the canopy. The trailing edge will be nearest the cart. The leading edge of the canopy will be the furthest behind the cart. **(SEE ILLUSTRATION 16.)**

Now you will put on your helmet and strap yourself into the seat of the craft. Once seated, you will start the engine or engines. Some go-cart styled powered paracraft have a pull cord that the pilot can pull down from over his shoulder to start the craft's engine or engines. The pilot will gradually increase throttle. This will move the go-cart forward and

ILLUSTRATION 17

GO-CART CANOPY INFLATING



create a large volume of air (propwash) to blow over the inverted canopy. The lines connecting the canopy will pull first on the leading edge, because it is the farthest from the cart. This will cause the canopy to pull straight off the ground in an airscoop fashion and inflate the cells, pulling the canopy overhead without dragging it on the ground. **(SEE ILLUSTRATION 17.)**

After the canopy has pulled off the ground and before it is overhead in flying position, the cart will

remain fairly stationary. Once the canopy is overhead the cart will begin to move forward. At this point you must tilt your head straight back and look up to check that the canopy is fully inflated and directly overhead. If the canopy is to one side or the other you will steer the cart via the front wheel to bring it directly under the canopy. Once the canopy is directly overhead and fully inflated you can ease the throttle to full on. As the craft accelerates forward the pilot must constantly check that his canopy is directly overhead and make small corrections, steering by his front wheel, to keep it there. The bumpy ride you experience over the grassy field suddenly becomes smooth as you are lifted off the ground, and begin to climb at a few hundred feet per minute. It would be unwise (especially for a beginning pilot) to make any turns below a few hundred feet, because turning causes the craft to lose altitude, or, in the case of a gentle turn at full throttle, the craft will fly without gaining altitude.

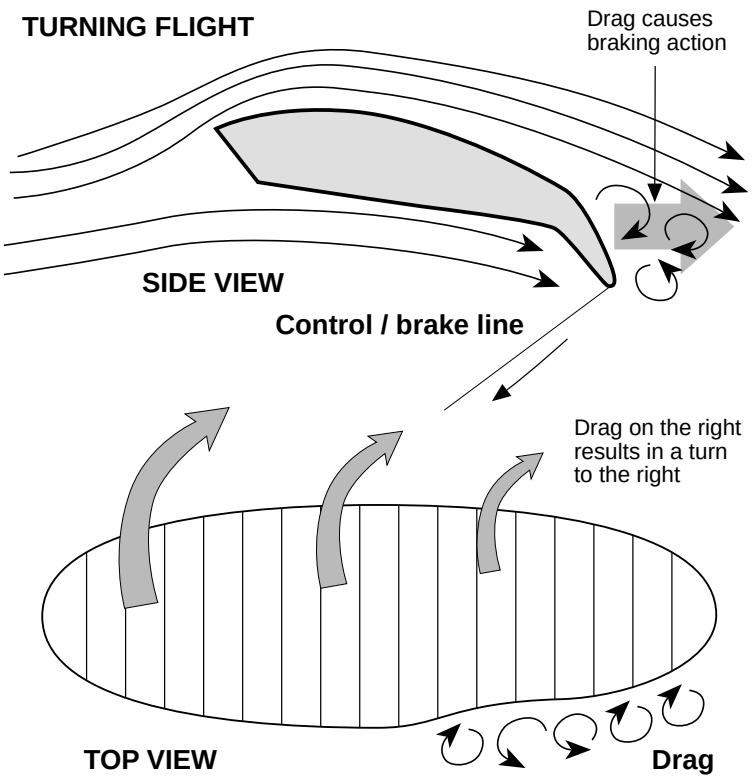
To turn the aircraft while in the air, you will use your foot to push the steering arm forward. This will pull on the steering line which is connected to the trailing edge on the same side. When the trailing edge on the right side is pulled down it causes the right side of the canopy to fly slower, causing the aircraft to turn to the right. The same is true for the left side. **(SEE ILLUSTRATION 18.)**

When in the air the go-cart powered parachute is very easy to fly. Push left steering arm to go left. Push right steering arm to go right. More throttle to go up, less throttle to go down. That's it.

Because of the pendular stability (the cart's tendency to hang straight down below the canopy) the aircraft has no pitch control to worry about and is inherently stable. If the engine or engines suddenly

ILLUSTRATION 18

TURNING FLIGHT

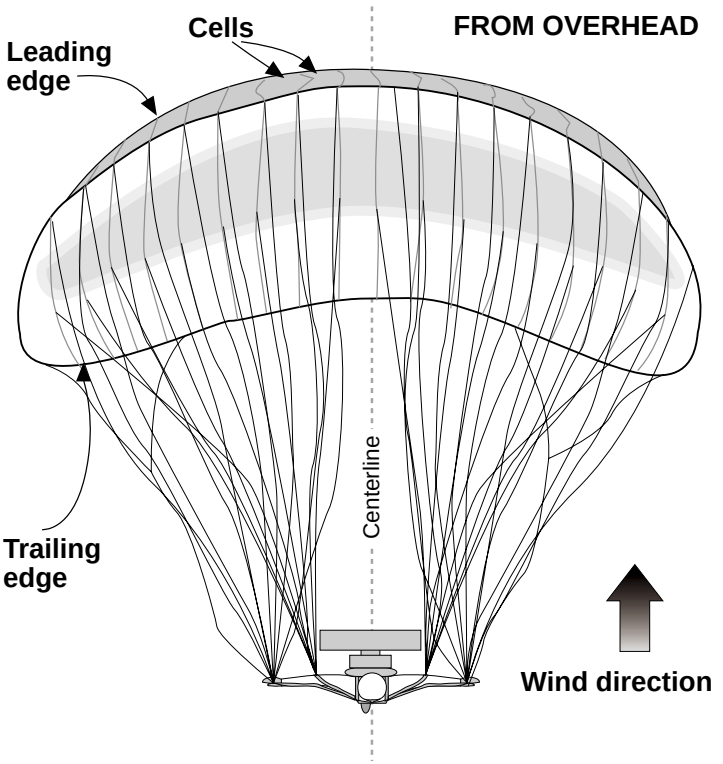


quit, the craft could land itself with no control input from the pilot (provided that it was a calm day, and it was aimed at a field instead of a tree).

For a gentler landing the pilot can flare or push both steering arms all the way forward just before contact with the ground, slowing down forward speed and descent speed. Note, if both steering arms are pushed all the way forward while too high, it can cause the craft to stall and fall straight down quite a ways before the canopy recovers. Obviously, if this is done at the wrong altitude this can be a serious problem. Of course, if that lovely engine is still

ILLUSTRATION 19

BACKPACK POWERED PARACHUTE SET UP FOR TAKEOFF

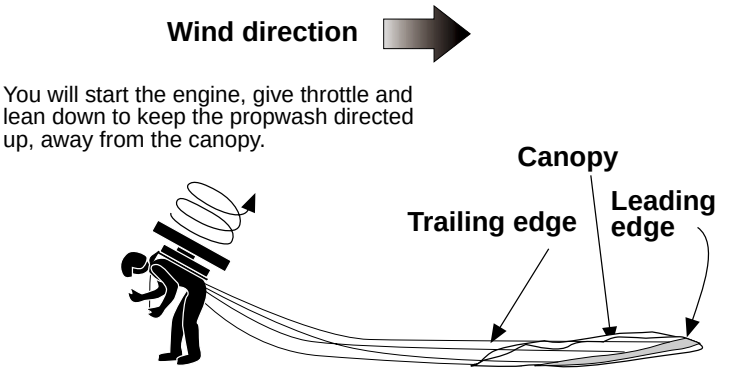


running, the pilot can use just enough throttle to flatten out the angle at which the craft approaches the ground, thus softening the landing and increasing the landing roll.

Now, on to the backpack powered parachute. Flying the backpack powered parachute is also easy, although you have more options and greater control. Backpack powered parachutes are more versatile and have more efficient flight characteristics. You can fly a backpack powered parachute from a smaller area and in more adverse weather conditions than a go-cart styled powered parachute. A backpack powered

ILLUSTRATION 20

LEANING DOWN TO WARM UP THE ENGINE



parachute gets better fuel economy, and can be flown for a longer period of time.

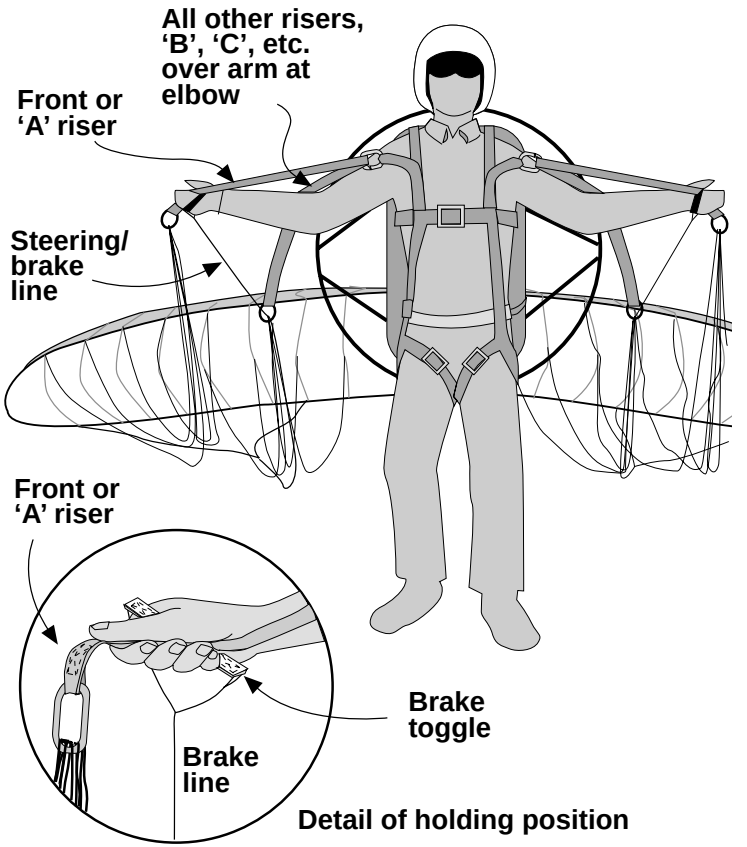
For simplicity's sake we will describe a take off in a zero-to-light wind. First you must lay out the canopy behind you on the ground, with the trailing edge closest to you and the leading edge farthest from you on it's back in a sort of horseshoe shape with the ends closer to you than the center, so that when you are hooked in you will be facing into the wind. **(SEE ILLUSTRATION 19.)**

Next you will put on the harness and the backpack motor assembly. Attach the shoulder bar to the harness, and engine, as needed. Then attach the support lines from the canopy to the center of the shoulder bar. Start engine. Lean down and give throttle to warm up the engine and to ensure that it is running properly, without blowing on the canopy or pushing you forward. **(SEE ILLUSTRATION 20.)**

Check to see that your lines are straight and untangled, lay the support lines over your out stretched arms, grab your toggles or steering line handles, grasp your front risers with your thumbs

ILLUSTRATION 21

POSITIONING THE RISERS



and make sure there is no slack between your harness and your 'A' support lines (front risers). **(SEE ILLUSTRATION 21.)**

Different backpack powered parachutes have different types of throttles. Until the canopy is overhead you will keep the engine at idle. Unlike with the go-cart, you do not want to use propwash to help inflate the canopy, because it is too turbulent and makes canopy inflation difficult. From the position shown in the illustration you will begin to run forward while

Just before takeoff.

pressing forward on your 'A' lines until the canopy is pulled overhead. You will be pushing forward on the 'A' lines, not pulling down, because when the canopy comes up, pulling down on the 'A' lines will collapse it. The canopy will not drag on the ground. The leading edge will pull up first and scoop in air to inflate the canopy. (*Learning to inflate the canopy and bring it overhead will take some practice. It is best to do this practice without the engine on your back in an open field, with little wind. This is called "kiting," because you're flying the canopy over your head like a kite. Practice can be a whole lot fun!*)

You will release the 'A' lines as soon as the canopy is overhead, and look up to check that the canopy is fully inflated and directly overhead. If the canopy is to one side or the other, you will move sideways to get under it while pulling the toggle on the high side. Once the canopy is fully inflated and directly overhead you will give the engine full throttle and run

Now that you have seen a small sample, are you ready to fly?

Are you ready to strap it on your back, zoom over the tree-tops and see the ultimate view?

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