“When once you have tasted flight, you will forever walk the earth with your eyes turned skyward, for there you have been, and there you will always long to return.”
— Leonardo da Vinci

**Goals of Training**
This is the beginning of a magnificent journey where you will realize your dreams of personal flight.

The goals of the training are simple:
1) Have fun throughout the entire training. After all, you got into this to have fun.
2) For you to learn as much as possible. I will not hold back information.
3) Within the best of my abilities, keep you from breaking yourself or your gear.

This PPG Solo Flight Training course will provide you with fundamental skills and knowledge for you to start on your own path toward independent and safe flight. When you complete the Solo Flight Training course, you will be a competent pilot, solely responsible for your safety, flying site selection, condition judging, decision making and self assessment.

This course is designed to be completed in 4 to 10 segments in 2 to 6 hour lengths, However, due to the unique qualities and circumstances of each student and the unpredictable weather conditions, the time can vary greatly from as short as a few days to several months. Your requirement is your commitment in time, effort, and safety.

**Challenges**
PPG training is challenging to both your mind and body. There is a strong physical aspect to PPG training and flight. Your health, fitness, and age will influence the physical aspect of your training from mild to rigorous. This is not to say that you must be an athlete to become a PPG pilot, but the physical demands of training precede the ease of proficient flight.

**What to Bring & Wear**
Be sure to come to the training prepared. Come rested, fed, and hydrated. Be sure to bring ankle supporting footwear with good traction, long pants (even in summer), sun block, sunglasses, a hat, one gallon of water, a few snacks, work gloves, and a camera if you like. Also bring clothing for changes in weather.

**Weather**
Occasionally the weather will not cooperate and we must cancel or postpone a class. If this happens, we will issue a “wind check” to come back and finish the class another day. No refunds can be issued after the class starts.

**Locations**
We train and fly in several areas in the Metro Phoenix, Arizona area. Our main location is based at PRA (Phoenix Regional Airport) in Maricopa. It’s located about 35 miles directly South of Phoenix. Visit www.airparamo.com/training/sites for more info.

**Spectators & Cameras**
Lastly, spectators, photographers, friends and family are not recommended during the training -- especially the first solo flights-- since they tend to cause unwelcome distractions that directly result in safety issue.

Mo Sheldon
Advanced Flight Instructor, ASC Certified
www.Airparamo.com
602-692-7995
Training
Airparamo is a Powered Paragliding (PPG) school located in Phoenix, Arizona and offers PPG training --both foot and wheel launched-- all year round (except holidays). Mo Sheldon, is an Advanced Flight Instructor certified through ASC (Aero Sports Connection). He offers training with state-of-the-art equipment and teaching techniques for your safe and effective training.

Airparamo offers different training programs for new pilots who want to learn this exciting form of personal flight. These training programs are divided into the following consecutive courses.

### Discovery Flights
$69 for 10 minutes  
$99 for 20 minutes  
$159 for 40 minutes  
We offer group discounts of three or more.

The discovery flight with a PPG instructor is an excellent way to get a good understanding of what it is like to fly a Powered Paraglider. During the flight, the student passenger can steer the paraglider if desired. Up to $99 of the Discovery Flight can be applied to the PPG Basic Solo Flight course.

### PPG Basic & Deluxe Solo Flight Courses
These courses will guide the student from terminology of the equipment through the student's first solo flights. The Basic Course covers the basics and up to 1 supervised solo flight with additional training purchased on a 1/2 day basis. The Deluxe Course is much more comprehensive and covers up to 10 supervised solo flights.

The first part of the courses will focus on terminology and maintenance of the complete gear, basic meteorology (weather to fly in), aviation regulations, inflation techniques (forward and reserve) with a backpack engine, foot launch techniques, simulator work, flight patterns and landing procedures, and a tandem flight. Once a student has a clear understanding of the flight procedures and techniques, the student's dream day arrives with a first solo flight.

Everyone progresses at a different rate, so the necessary time will be taken with you to insure you are trained properly and flying safely before you are encouraged to fly by yourself. Students may spread out training over several weekends if desired.

Because it is best to learn on the equipment one will actually fly in the future, students are encouraged to purchase or have their own equipment to do this complete.

Payment for the PPG Solo Flight courses is required in full at the beginning of the course. There are no refunds for training, unless extraordinary circumstances arise which are decided at the sole discretion of Airparamo staff.

### Per Day Training
$185/ 1/2 day (from 2-5 hours)
After the completion of the PPG Basic Solo Course, a PPG Advanced Course will focus more on finding areas where the student needs to improve and build experience and confidence. We will provide focused attention to ground handling, inflation, foot launch techniques, flight and landing patterns as well as on flight emergency procedures as the student requires. This training is done on a one-to-one basis, where the student gets undivided attention from the instructor.

### Instructor & Tandem Training
Instructor and tandem training is available. Please contact us for pricing and details.
**Recommended Reading**
Here is a list of books Airparamo highly recommends:

**The Powered Paragliding Bible** by Jeff Goin  
Paperback; 320 pages; full color  
This book is the most thorough manual ever produced for our sport, offering a concise treatment of subject matter for anyone serious about flying. It will be appreciated by those just learning as well as those wanting to master the sport. Colorful photos and carefully designed diagrams on each page add to the wealth of well organized content.

**Paramotoring From the Ground Up** by Noel Whittall  
ISBN: 1840371056; Paperback; 190 pages  
This comprehensive guide to Powered Paragliding is a must have for anyone with an interest in the sport regardless of experience. Colorful glossy photos also add to the informative and well organized content.

**Powered Paragliding** by Jose Ortega  
ISBN 84-87695-11-6; Paperback; 352 pages  
An excellent book with hundreds of color photos and illustrations from equipment to training to advanced maneuvers. Very strongly recommended.

**The Art of Paragliding** by Dennis Pagen  
ISBN 0-936310-09-X; 8 1/2 x 11 paperback; 342 pages  
Dennis Pagen is very well known in both Hang-Gliding, Ultralight and Paragliding circles, having written and published books on all three subjects, as well as on meteorology for pilots. Whether you are new to paragliding or wish to take a refresher course to polish your skills, this book is sure to provide a goldmine of information, including 248 illustrations and 86 photos.

**Understanding the Sky** by Dennis Pagen  
ISBN: 0936310103; Paperback  
The book takes a very complicated subject and boils it down to the bare essentials necessary to have a working knowledge of weather. Quite a feat! Of course it helps to have an interest in weather from a ultralight pilot’s perspective.

Here is a list of videos Airparamo highly recommends:

**Parastars** by Philip Russman of Lite Touch Films  
Running time: 58 minutes  
Parastars takes you on a tour of the biggest PPG convention ever. Experience the freedom of taking off and landing on your feet in sunny Florida. Learn how fast, how far, how easy. Introduction to launching, competition demonstrations, overview of 7 spectacular flying sites, Guinness world record attempt, soaring without the motor, and much more!

**Risk & Reward** by Philip Russman of Lite Touch Films  
Running time: 70 minutes  
After 3 years of research and gathering video from around the world, this is must see for all PPG pilots, beginner and advanced. Introduced by William Shatner, this DVD covers a wealth of information packed into 70 action packed minutes of exceptional video, narration and music. Risk and Reward covers fundamentals that are certain save wear and tear on your equipment, your body, and your wallet, including the 4 most common causes of injury and more importantly how to avoid them.
PPG Solo Training Syllabus

1. Discovery Flight

2. In The Classroom
   a. Weather
      i. Atmosphere
         (1) Solar Radiation
         (2) Convection
         (3) Coriolis Effect
         (4) Warm/Cold Front
         (5) Clouds
ii. Air
   (1) Fluid With Mass
   (2) Pressure and Altitude
   (3) Humidity
   (4) Temperature
   (5) Density

iii. Wind
   (1) Mechanical Turbulence
   (2) Rotor
   (3) Wind Gradient
   (4) Venturi
   (5) Anabatic/Catabatic Flow

iv. Thermals
   (1) Solar Radiation
   (2) Convection
   (3) Stability/Instability
   (4) Dew Point
   (5) Dust Devils
b. What Is A PPG?
   i. Personal Flight Realized
   ii. Equipment
      (1) Wing/Paraglider
         (a) Canopy
         (b) Lines
         (c) Risers
      (2) Motor Unit
         (a) Harness
         (b) Cage/Frame
         (c) Motor
         (d) Throttle
      (3) Accessories
         (a) Helmet
         (b) Radio
         (c) Reserve Parachute
         (d) Knee Protectors
         (e) Gloves
         (f) GPS
c. Aerodynamics
   i. The Airfoil - Why It Flies
      (1) Basic Shape
      (2) Lift
      (3) Drag
      (4) Glide
      (5) Chord Line, Angle of Attack, and Attitude
      (6) Vortices

   Figure - Forces on a Wing

   Figure - Drag of Various Shapes

   Figure - Primary Flight Angles

   Figure - Induced Drag

   Figure - Axes of Rotation

   Figure - Paraglider Airfoil - The Inflated Canopy

   Figure - Wingtip Vortices

   Figure - Canopy Outward Inflation
ii. Airspeed and Ground Speed
   (1) Upwind/Downwind
   (2) Crabbing
   (3) Stall
   (4) Min Sink
   (5) Best Glide

iii. How Brakes Work
d. Getting Lift
   i. The Motor’s Primary Function
   ii. Thermals
   iii. Updrafts
      (1) Ridge Lift

e. Launching
   i. Terrain
      (1) Flat
      (2) Sloped
      (3) Clear of Obstructions
         (a) Buildings
         (b) Power Lines
      (4) Ground
         (a) Vegetation
         (b) Surface Texture
   ii. Wind
      (1) Laminar or Gusty
      (2) Direction
      (3) 0 To 2: Intermediate
         (a) Light and Irritable
      (4) 3 To 12: Beginner
      (5) 13 To 20: Intermediate To Advanced
   iii. Launch Type: Forward or Reverse?
f. Flying
   i. Hand Positions
   ii. Where To Look
   iii. Flight Plan
   iv. Steering With Brakes and Weight Shift
   v. Right of Way Rules
      (1) Right Has Right of Way
   vi. Thermaling Rules
      (1) Same Direction as Other Pilots
   vii. XC

g. Landing
   i. Checking Wind Direction and Obstacles
   ii. Picking A Landing Spot
   iii. Landing Approaches
      (1) 45 Degree Box from Obstructions
      (2) Finding Where You Will Land From the Air
      (3) Adjusting Your Glide
         (a) Figure 8's
   iv. Flare

![Diagram of flying and landing techniques]
h. Dynamic and Transient Canopy States
   i. Collapses
      (1) Tip
      (2) Half Wing
      (3) Asymmetric
      (4) Big Ears
   ii. Pendulum/Surge
      (1) Pitch
      (2) Roll
      (3) Spiral
   iii. Stalls
      (1) B Line
      (2) Full
      (3) Spins

i. When Everything Goes To Hell
   i. Turning Off the Motor
      (1) Pull Spark Plug
      (2) Crimp Fuel Line
   ii. Flying Without Brakes
      (1) Steering With the D Risers
   iii. Reserve Deployment
      (1) Not A Second Chance, A Last Chance

j. Legal Stuff
   i. FAR 103
      (1) 254 Pounds or Less
      (2) 5 Gallons of Gas Max
      (3) 55 Knots Max; 24 Knots Stall
      (4) Recreation or Sport Purposes Only
      (5) No Clouds
      (6) Daylight Only
         (a) Strobes Extend 1/2 Hour
      (7) Not In Congested Areas
      (8) No License, No Medical Exams, No Numbers, No Required Maintenance.
   ii. Tandem Exemptions
   iii. Sport Pilot Applicability

3. Buying Equipment
   a. Used or New?
   b. Backpack or wheels?
   c. Glider Selection
      i. DHV or AFNOR Ratings
      ii. Correct Size
      iii. Handling
      (1) Ease of Inflation
      (2) Turning, Braking
      (3) Stability
      iv. Construction
      v. Features
   d. Motor Selection
      i. Reliability
      ii. Thrust / Power
      iii. Weight
      iv. Noise
      v. Comfort
      vi. Electric Start Vs. Manual Start
      vii. Portability
      viii. Cage Strength
   e. Accessories
      i. Windsock
      ii. Ear Protection
      iii. Helmet
      iv. Communication Gear
         (1) Radio
         (2) Noise Cancelling Mic
      v. Altimeter/Vario
      vi. GPS
      vii. Windmeter
      viii. Engine Gauges
         (1) Tachometer, Temperature (EHT, CHT)
      ix. Gas Supplies
         (1) Gas Can(S), Oil Mixing Measurer
      x. Basic Tools
4. Equipment Familiarization

a. Glider
   i. Canopy
      (1) Fabric
      (2) Cells
      (3) Openings
      (4) Ribs
   ii. Lines
      (1) Spectra, Kevlar
      (2) Attachment Points
      (3) Cascade
   iii. Quick Links
      (1) Tightness
      (2) Line Keepers
   iv. Risers
      (1) A, B, C, D's
      (2) Hook In Points
   v. Brakes
   vi. Speed System
      (1) Speed Bar
      (2) Trim Tabs
   vii. Placard
      (1) Certifications: DHV, AFNOR
      (2) Weight Range
   viii. Care and Maintenance
      (1) UV
      (2) Heat
      (3) Moisture
      (4) Salt, Sand, Dirt, Grit
      (5) Washing
      (6) Storage / Memory
      (7) Repairs

b. Motor
   i. Controls
      (1) On/Off
      (2) Starter
      (3) Other
   ii. Two Stroke Engine
      (1) Operation
      (2) Suck/Blow, Squeeze/Ignite
      (3) Oil and Gas Mix
   iii. Tuned Exhaust
   iv. Air Intake Silencer
   v. Carburetor
      (1) Float
      (2) Membrane
   vi. Propeller
      (1) Size
      (2) Pitch
      (3) 2, 3, or 4 Blades
      (4) Care and Maintenance
      (5) Balance
      (6) Repair
   vii. Cage
   viii. Harness
      (1) Straps, Buckles, and Adjustments
      (2) Carabiners
   ix. Reserve Placement
   x. Care and Maintenance

c. Trike

d. Flying Accessories
   i. Helmet
   ii. Ear Protection
      (1) Over Ear
      (2) In Ear
   iii. Radio
   iv. Boots
   v. Eye Protection / Glasses
   vi. Knee Pads
   vii. Gloves
5. **Canopy Handling**

a. Layout

b. How To Avoid Being Dragged

c. Forward Inflations
   i. Hooking In
   ii. Riser and Brake Arrangement In Hands
   iii. Feeling Symmetrical Tension In the A Lines
   iv. Body Position, Driving Stance, Anchor
   v. Walk/Run
   vi. Tension Feedback In A Lines
   vii. When To Let Go of As
   viii. Stay Centered Under Wing
   ix. Kite With Brakes

d. Reverse Inflations
   i. Sideways Hook In
   ii. Turning To Face the Canopy
   iii. No Hands Inflation
   iv. Riser and Brake Arrangement In Hands
   v. Build A Wall
      (1) Fly the Glider 1’ Up and Set It Down, Cells Facing Upwards
   vi. Kiting Overhead With Brakes or D’s and As
      (1) Controlling Overshoot
   vii. Stay Under Center of Wing
   viii. Kiting Overhead With Brake Lines
   ix. Reversing After Landing
   x. Canopy Deflation With D Risers

e. Kiting Fun
   i. Walking the Wing Overhead
   ii. Chicken Wars With Other Pilots
   iii. Timed On A Footstool

f. Rope Towing
   i. Towing Procedure
   ii. Launches, Forward and Reverse
   iii. Straight and Level Flight
   iv. Flare Timing
   v. Landing

6. **Motor Handling**

a. Familiarization

b. Getting It On
   i. Getting In On the Ground
   ii. Standing Up

c. Walking/Rolling Without Power

d. Full Power Test

e. Quick Shut Off

f. Kiting With No Power

g. Kiting With Power

h. Standing, Walking, Jogging
7. **Simulator**
   a. Hang Test  
   b. Getting Into the Seat  
   c. Hand Positions  
   d. Throttle Test  
   e. Communication
      i. Helmet and Radio  
      ii. Sign Language
         (1) Yes/No With Feet  
         (2) Throttle, Arm Points Up/Down  
         (3) Land Now, Both Arms Point Down To Ground  
         (4) Turn, Arm Points Left/Right  
         (5) Flare, Both Arms Moving Down
   f. Simulated Flight
      i. Take-Off  
      ii. Practice Pattern  
      iii. Turns  
      iv. Prepare For Landing
         (1) Look at Windsock  
         (2) Aim For the Wind  
         (3) Shut Off Engine  
      v. Landing
         (1) Flare Timing  
         (2) Stay On Feet  
         (3) Turn Around

8. **Flying**
   a. Look At Windsock Often  
   b. Launches, Forward and Reverse  
   c. Turns, 360s, S Turns  
   d. Landing Approaches  
   e. Flare Timing  
   f. Landing

9. **Conclusion**
   a. What You Have Learned  
   b. Final Thoughts and Recommendations
      i. Get Lots of Kiting Practice  
      ii. If Possible, Fly With Others  
      iii. Keep Current, You Will Forget With Time  
      iv. Further Training On Improving Technique  
      v. Beware of the PPG Addiction Dilemma

10. **Practice, Practice, Practice**
    a. Go Fly!

Most diagrams in this syllabus were reproduced with permission from the author from the book *Walking On Air: Paragliding Flight* by Dennis Pagen.  
All photos and text are copyright protected by Mo Sheldon and Airparamo, 2002-2006.
Notes:
Appendix A: 20 Nuggets of PPG Flight Wisdom

1. Every takeoff is optional. Every landing is mandatory.

2. If you let the throttle out, the houses get bigger. If you push the throttle in, they get smaller. That is, unless you push the throttle in and pull on the brakes real hard, then they get bigger again.

3. Flying isn’t dangerous. Crashing is what’s dangerous.

4. It’s always better to be down here wishing you were up there than up there wishing you were down here.

5. The ONLY time you have too much fuel is when you’re on fire.

6. A ‘good’ landing is one from which you can walk away. A ‘great’ landing is one after which they can use the PPG again.

7. Learn from the mistakes of others. You won’t live long enough to make all of them yourself.

8. The probability of survival is inversely proportional to the angle and speed of arrival. Large speed and angle of arrival, small probability of survival and vice versa.

9. Stay out of clouds. The silver lining everyone keeps talking about might be another airplane going in the opposite direction. Reliable sources also report that mountains have been known to hide out in clouds.

10. Always try to keep the number of landings you make equal to the number of take offs you’ve made.

11. There are three simple rules for making a smooth landing. Unfortunately no one knows what they are.

12. You start with a bag full of luck and an empty bag of experience. The trick is to fill the bag of experience before you empty the bag of luck.

13. If all you can see is ground that’s going round and round and all you can hear is commotion coming from your wing flapping around you, things are not at all as they should be.

14. In the ongoing battle between objects travelling through the air and the ground not travelling at all, the ground has yet to lose.

15. Good judgment comes from experience. Unfortunately, experience usually comes from bad judgment.

16. It’s always a good idea to keep the pilot end going forward as much as possible.

17. Keep looking around. There’s always something you’ve missed. (Isn’t that why they came up with checklists?)

18. Gravity is not just a good idea. It’s the law. And it’s not subject to repeal.

19. The three most useless things to a pilot are the altitude above you, runway behind you and a tenth of a second ago.

20. There are old pilots and there are bold pilots. There are, however, few old, bold pilots.

Appendix B: Hand Signals

by John Phillips
November 26, 2003

I pass this along as its beauty lives in the simplicity.

As PPG grows in popularity so do the number of pilots flying together. In some cases radios are worn and communications between the pilots is good. Other times there are no radios, or not everyone is wearing one, and communications are poor or nonexistent.

A friend I fly with always uses hand signals to alert me before he is going to make a turn. When he is ready to turn left he simply sticks his arm out to the left, just like on a bicycle. I immediately know what he is about to do and am prepared for it. As we are usually flying in close proximity I appreciate the advance notice of his intentions.
Appendix C: Airspace ABCs

By Grant Smith

When giving check rides or refresher courses I find that knowledge of the Federal Airspace System is one of the areas where pilots frequently have difficulty. I typically have the applicant refer to a Sectional Chart for the local area and have them find their flying location. Then I ask, “When you first take off, what classification of airspace are you immediately flying in?” We then progress on an imaginary typical flight and discuss the airspace changes and the effect on the flight requirements as we proceed across the chart.

One significant point of confusion among students is that we fly in “controlled airspace” all the time yet we are not controlled by anyone. In the back of their mind, the student knows there are “air traffic controllers”. Yet, when we fly in Class E controlled airspace, we do not talk to the controller. This does not compute until it is explained that our primary concern is that we have the required VFR weather minimums that will allow us to operate without the requirement to be under the watchful jurisdiction of the controller.

In other words, we need to know the various types and locations of airspace so that we can avoid the necessity of being controlled, or if required, we can maintain the necessary controller contact and authorization. Once this useful concept is grasped, a pilot is more susceptible to learning the otherwise insignificant airspace designations. I have developed the following litany to assist in remembering the significance and location of the various airspace designations.

A is for Altitude. Class A airspace is high Altitude airspace. It starts at 18,000 feet which is high enough that you don’t want to go there even in an Ultralight without oxygen. It covers nearly all of the USA. Specifically, it covers the 48 contiguous states and most of Alaska and extends to 12 NM or more beyond the coastline.

B is for Big. Class B is for Big airplanes and Big airports. It is shown by a wide shaded Blue line and Blue numbers specify the altitude limits. Boycott Class B airspace because you may not enter unless you have a clearance and it is not likely you will get one in your little Ultralight. The magic words “Ultralight E123 cleared to enter the Class B Airspace”, are not likely to be transmitted.

C is for Communicate. This is the highest class of airspace that the typical ultralight pilot is likely to enter. You must Communicate before you enter Class C airspace. Class C airspace is shown by a wide shaded line and numbers similar to Class B airspace. However, it is not blue it is magenta. Magenta a Common Color for printers. Communication involves sending and receiving. You must talk to the controller and he must reply to indicate that you were heard. For example, you say “Widby Approach Ultralight E123.” and Widby Approach responds “Ultralight E123 standby.” You have communicated with Widby Approach. You may now enter Widby Approach Class C airspace with caution. Caution is recommended because it is a high density, high speed traffic area.

D is for Directions. Class D airspace is designated at airports with an operating control tower. A tower controller gives Directions for you to follow. Examples are: “Ultralight E123 report one mile south of the field.” “Ultralight E123 enter left downwind for runway 24.” “Ultralight E123 taxi via Taxiway Brovo to parking.” If the tower is not open 24 hours a day. The airspace reverts to Class E or Class F when the tower is closed. Refer to the Aeronautical Information Manual (AIM) to determine the tower hours of operation and the class of airspace after closing. See Renton, Washington airport (KRN) airport for an example.

E is for Everywhere. Class E airspace is Everywhere. It is similar to Class A Airspace in that it covers the Entire US up to the overlying Class A airspace. The question is not where it is but how high is the floor. It is generally 700 or 1200 feet AGL as noted by the wide, feathered on one side, shaded magenta line (see the Sectional Chart legend). The feathered side is a 700 foot floor and the sharp edge side is a 1200 foot AGL floor. However it is generally easiest to just look at the relative congestion to determine the lower floor. Some moderate size airports, not busy enough to justify the expense of a control tower may have a Class E surface area associated with the airport designated by a dashed magenta line. The dashed magenta line is similar to the blue dashed line around a towered airport. Ultralights may not enter this non tower airport surface area without permission from the controlling authority (FAR 103.17). Note: The controlling authority is not the airport manager! It is the Federal Air Traffic Control Facility responsible for the surrounding airspace. It may be an approach or enroute air traffic control facility. A Flight Service Station can help you contact the controlling facility. In rare, remote locations the floor of the Class E airspace may be higher than 1200 feet AGL but it is never higher than 14,500 feet MSL. Examples of this may be found on the Seattle Sectional Chart Legend.

F is for FAA Airs Failure or Foreign. The FAA has failed to designate any Class F Airspace in the USA. Only Foreign Governments designate Class F Airspace.

G is for Good. Class G Airspace is the Good Stuff. It is uncontrolled. That doesn’t mean you can do whatever you want. You are still limited by FAR 103. However, you will never have a need to talk with a controller and the weather minimums are the lowest you will find for Ultralight operations.

If you need a pneumonic to assist in remembering the above word associations, try the following:

Big Astronauts Communicate Good Directions Everywhere. Notice there is no F as there is no Class F airspace in the US. I am not a big fan of pneumonic word association, as you still need to remember what the pneumonic means and associate it with the real world. If this doesn’t help, then I hope you found it amusing.
Appendix D: Demons of the Air

by Mo Sheldon
June 24, 2004

Most incidents could be avoided by being aware of what I like to call ‘Demons Of The Air’. These Demons come out to cause havoc with our thinking and judgement when we take to the air. They have caused significant trouble for me and other pilots. I share them with you to hopefully reduce your possibility of a future incident. Here is a list of some of the Demons I have identified to be aware and cautious of the next time you take to the air:

The 'Down Wind' and 'Cross Wind' Demons. These Demons seduce you to take-off or land or fly down or cross wind low to the ground. It's easy to get caught up in the rush of ground whizzing under you. Or to think you can pull a cross or down wind take-off or landing off. Having wheels can seem to give you added ease and protection. However, emergency landings are challenging enough in perfect conditions. And having an emergency landing in down wind or cross wind is simply a recipe for disaster, especially over rough terrain. Here are three excellent precautionary measures that have helped me to keep these Demons at bay:
1) I try to always take-off and land into the wind. If the wind changes direction, I reset my gear or compensate accordingly to head directly into the wind.
2) I always have enough altitude to position myself for a safe landing into the wind. This means that when I fly down or cross wind, I give myself enough altitude to safely turn and land into the wind.
3) I constantly am scanning for places to safely land. For me, this habit is so ingrained it's like second nature.

The 'Density' Demon. This is a sly Demon that sneaks in to get you when you want to climb and you don't get a climb like you expect. The reality is that a rise in temperature and altitude make our wings have less lift and our motors and props produce less thrust. Even a 10 degree change in temperature can greatly affect climb rate, changing a climb from acceptable to poor. The best precaution for this Demon is to give yourself additional room on takeoff and landing and fly with a greater altitude.

The 'Invincible' Demon. This Demon plays on your ego, seducing you to push yourself and your gear beyond it's limitations. The fact is our bodies are made of soft stuff that can break and die if it is smacked too hard. A good precaution is to wear protective gear such as helmets, knee pads, pants, eyewear, and gloves. I know of 3 PPG pilots (myself included) that openly admit their helmet saved their lives in separate PPG incidents.

The 'Watch This' Demon. This Demon comes out to play when cameras and spectators (especially family) show up. Be aware that this Demon can very powerfully cloud your judgement and thinking. The best way to tell this Demon is at play is if you find yourself taking more risks beyond what you normally do or feeling more cocky than usual in front of crowds and cameras. Pushing your limits can be healthy, but I suggest practicing alone or around experienced pilots first, not in front of spectators and cameras. A powerful precaution is be able to say 'no' and choose to pack things up to fly another day.

The 'Nothing Fails' Demon. We like to think our gear will never fail us. This Demon plays on this wish. But our gear and carelessness can and do fail us. It is not uncommon for me to forget something like attaching a velcro strap or connecting a riser with a twist or forgetting to add fuel or notice a developing crack in my exhaust. The best way to control this Demon is to follow strict pre- and post-flight checks of your gear. A good pre- and post-flight inspection will catch any oversights in your set-up and spot any inevitable problems with your gear.

The 'Predictable Weather' Demon. Mother Nature does follow general patterns, but from time to time her logic throws you for a loop. Here's an example of what I'm talking about: I did a tandem flight recently in an area I have flown dozens of times in perfect morning conditions. On this flight at about 300' above ground I began to lose altitude. I went to full throttle and still I was losing altitude. This went on for what seemed like 60 seconds where I began to seriously consider places for an emergency landing. Then suddenly, without warning I slowly started to gain altitude again. Nothing was different with the operation of my motor or wing. My only guess is I must have flown into a huge pocket of sinking air. The fact is even in perfect conditions, the air can (and will) become unpredictable. A good precaution for this Demon is to give yourself extra room to make decisions calmly and with complete control.

Be sure you are aware of your Demons. If you recognize and accept that they exist and affect you, you will greatly reduce your chances of an incident. If you ignore them, you are needlessly adding significant risk to your flying, which inevitably increases the likelihood of you having an incident.
Appendix E: PPG Check Lists

1. Preflight
   a. Local conditions
      i. Check sectional chart for airspace awareness
      ii. Check with the local FSS for TFR’s
      iii. Check times of sunrise/sunset
      iv. Check local weather forecast
   b. If flying alone
      i. Let someone know your flight plans
      ii. Carry a cell phone
   c. Set up windsock
      i. Check wind direction, amount, quality (change of speed and direction)
   d. Plan your launch and landing
      i. Assess the launch and landing area
      ii. Have a more than one plan in place for an engine out or in-flight emergency
   e. Unpack and assemble gear
      i. Assemble motor
         (1) Check motor master kill switch is set ‘Off’
         (2) Check fuel level and add fuel if necessary
         (3) Check all velcro straps are secure
         (4) Harness inspection (straps, webbing, stitching, seatboard)
         (5) Check harness is attached correctly
         (6) Check throttle cable is free
         (7) Check all bolts and carabiners
         (8) Move propeller back and forth and check for unusual play in bearings
         (9) Check rubber vibration mounts for cracks
         (10) Check wiring (loose connector or worn wires)
         (11) Check fuel and intake lines for wear
         (12) Move muffler and carburetor for unusual play
         (13) Check belt tension
         (14) Check for cracks on exhaust, frame, and motor
         (15) Check for unusual leaking
         (16) Check air intake silencer or filter is secured
      ii. Assemble wheels (skip this step if you are footlaunching)
         (1) Check motor master kill switch is set ‘Off’
         (2) Attach motor to wheels
         (3) Check all bolts and carabiners
         (4) Check all cables are tight
         (5) Check all velcro straps are secure
         (6) Check tire pressure
   f. Warm up the engine
      i. Turn motor master kill switch to ‘On’
      ii. Aim direction of prop blast
      iii. Announce ‘Clear prop’ and start motor
      iv. Check kill switch operation with a momentary ‘blip’
      v. Conduct a full throttle check
      vi. Check for unusual vibration and that motor functions normally
      vii. Shut the motor down with the master kill switch to check its operation
   g. Layout the wing into the wind
      i. Visual inspection of the canopy, lines and risers
      ii. Check that lines are not tangled and risers are clear
      iii. Check for objects inside the wing
      iv. Check for tears and holes in the fabric
      v. Check trimmers are set correctly
   h. Attach accessories
      i. Helmet, radio, camera, GPS, etc.
      ii. Check battery level and operation of accessories
      iii. Reserve Parachute (if necessary)
         (1) Check that reserve container is secured to the harness
         (2) Check that briddles are routed properly and securely connected to harness
         (3) Check that the speed system (if attached) will not interfere with reserve
         (4) Check reserve pins and that velcro is not ‘locked’
         (5) Check that reserve handle is secure
         (6) Check that hook-knife is secure and reachable
      i. Turn motor master kill switch to ‘On’
   j. Decide on a forward or reverse launch
   k. If wheel launching, attach risers to harness
   l. Get into harness and attach all straps and buckles
   m. If foot launching, stand up and attach risers to harness
   n. Final check before launch
      i. Check windsock
      ii. Check that radio, camera, etc. are strapped to harness
      iii. Check fuel level and fuel cap is installed
      iv. Check that the reserve parachute is correctly installed (if necessary)
      v. Check that risers are attached correctly
      vi. Check radio operation (if necessary); radio on, correct frequency, and volume
      vii. Check that helmet strap is secure
      viii. Check that harness straps are secure
      ix. Check that throttle cable is free and functions correctly
      x. Check that brake controls are in hands without tangles
      xi. Look for lines lying across your feet
      xii. Check for other pilots on the ground and in the air
      xiii. Go over flight plans in case of an engine out or emergency
2. Launch
   a. Start motor and warm it up
   b. Check windsock
   c. Inflate wing
      i. Check wing is nicely overhead
      ii. If possible, check lines are all free
      iii. If possible, check brakes are not tangled
   d. Stay headed into wind
   e. Keep kiting the wing during entire launch sequence
      i. Do not leave ground if wing is penduluming
   f. If footlaunching, keep feet down and moving until airborne

3. Flight
   a. If using a reserve, check handle
   b. Always plan for an emergency landing
      i. Constantly search for landing areas
      ii. Constantly keep a reference for wind direction
      iii. Fly downwind with enough altitude to safely turn and land into the wind
   c. Look out for other pilots, power lines, and obstructions
   d. Always look before you turn, climb or descend
   e. If flying a loud motor, stay away from people and animals
   f. If you have a problem (such as tangled lines or motor is not operating correctly)
      i. Continue to fly the PPG
      ii. Stay calm, do not panic
      iii. Make preparations to land and correct the problem

4. Landing
   a. Look for wind direction (windsock)
   b. Look for obstacles on the landing area
   c. Head into the wind
   d. If footlaunching, lower feet into landing position
   e. Reduce prop rotation or kill engine
   f. Flare within a few feet of ground
   g. Bring wing down by pulling brakes
   h. If footlaunching, turn around to face wing
   i. Detach wing from harness
   j. Remove helmet
   k. Unbuckle from harness and step away from PPG
   l. Turn motor master kill switch to "Off"
   m. Check to make sure for anything that needs to be stowed (cameras, radios)

5. Postflight
   a. Pack up wing
      i. Be sure wing is dry
      ii. Isolate risers from lines to prevent tangles
      iii. Inspect wing for debris in the lines, cells, and wing bag
      iv. Turn motor master kill switch to "Off"
   b. If flying alone, contact the person you told about your flight plans
   c. Detach motor from wheels (if necessary)
   d. Check over motor
      i. Check motor master kill switch is set "Off"
      ii. Clean as necessary
      iii. Check all bolts, carabiners, cables, velcro straps are good
      iv. Check belt tension
      v. Check for cracks on exhaust, frame, and motor
      vi. Check for any unusual leaking
   e. Check over wheels (if necessary)
      i. Clean as necessary
      ii. Check all bolts, carabiners, cables, velcro straps are good
      iii. Check for cracks on frame
   f. Check wheels and bearings are in good shape
   g. Pack up motor
      i. Check motor master kill switch is set "Off"
   h. Pack up wheels (if necessary)
   i. Pack up accessories
      i. Be sure all accessories are turned off
   j. Pack up windsock
   k. Pack away fuel and tools
   l. Pick up any garbage and leave site cleaner than you found it
   m. Double check you did not leave anything behind

Quick Check Before Launch - Start Toe to Head
This approach starts from the bottom up, with your toes all the way up your body to your head.
1. Check shoelaces are tied
2. Check leg straps are secured
3. Check center strap is secured
4. Check reserve strap (if necessary)
5. Check throttle cable is free and secure
6. Check brakes are in correct hands
7. Check brakes are free of tangles
8. Check carabiners are locked
9. Check helmet is secured
10. Check ear protection is on
Appendix F: F.A.A. Part 103, Ultralight Vehicles

Subpart A-General
103.1 Applicability
103.3 Inspection requirements
103.5 Waivers
103.7 Certification and registration

Subpart B-Operating Rules
103.9 Hazardous operations
103.11 Daylight operations
103.13 Operation near aircraft; right-of-way rules
103.15 Operations over congested areas
103.17 Operations in certain airspace
103.19 Operations in prohibited or restricted areas
103.20 Flight Restrictions in the Proximity of Certain Areas Designated by Notice to Airmen
103.21 Visual reference with the surface
103.23 Flight visibility and cloud clearance requirements

Authority
Secs. 307, 313(a), 601(a), 602, and 603, Federal Aviation Act of1958 (49 U.S.C. 1348, 1354(a), 1421(a), 1422, and 1423); sec. 6(c), Department of Transportation Act (49 U.S.C. 1655(c). Source: Docket No. 21631, 47 FR 38776, Sept. 2, 1982, unless otherwise noted.

Subpart A-General

103.1 Applicability
This part prescribes rules governing the operation of ultralight vehicles in the United States. For the purposes of this part, an ultralight vehicle is a vehicle that:
(a) Is used or intended to be used for manned operation in the air by a single occupant;
(b) Is used or intended to be used for recreation or sport purposes only;
(c) Does not have any U.S. or foreign airworthiness certificate;
(d) If unpowered, weighs less than 155 pounds; or
(e) If powered:
(1) Weighs less than 254 pounds empty weight, excluding floats and safety devices which are intended for deployment in a potentially catastrophic situation;
(2) Has a fuel capacity not exceeding 5 U.S. gallons;
(3) Is not capable of more than 55 knots calibrated airspeed at full power in level flight; and
(4) Has a power-off stall speed which does not exceed 24 knots calibrated airspeed.

103.3 Inspection requirements
(a) Any person operating an ultralight vehicle under this part shall, upon request, allow the Administrator, or his designee, to inspect the vehicle to determine the applicability of this part.
(b) The pilot or operator of an ultralight vehicle must, upon request of the Administrator, furnish satisfactory evidence that the vehicle is subject only to the provisions of this part.

103.5 Waivers
No person may conduct operations that require a deviation from this part except under a written waiver issued by the Administrator.

103.7 Certification and registration
(a) Notwithstanding any other section pertaining to certification of aircraft or their parts or equipment, ultralight vehicles and their component parts and equipment are not required to meet the airworthiness certification standards specified for aircraft or to have certificates of airworthiness.
(b) Notwithstanding any other section pertaining to airman certification, operators of ultralight vehicles are not required to meet any aeronautical knowledge, age, or experience requirements to operate those vehicles or to have airman or medical certificates.
(c) Notwithstanding any other section pertaining to registration and marking of aircraft, ultralight vehicles are not required to be registered or to bear markings of any type.

Subpart B-Operating Rules

103.9 Hazardous operations
(a) No person may operate any ultralight vehicle in a manner that creates a hazard to other persons or property.
(b) No person may allow an object to be dropped from an ultralight vehicle if such action creates a hazard to other persons or property.

103.11 Daylight operations
(a) No person may operate an ultralight vehicle except between the hours of sunrise and sunset.
(b) Notwithstanding paragraph (a) of this section, ultralight vehicles may be operated during the twilight periods 30 minutes before official sunrise and 30 minutes after official sunset or, in Alaska, during the period of civil twilight as defined in the Air Almanac. If:
   (1) The vehicle is equipped with an operating anticollision light visible for at least 3 statute miles; and
   (2) All operations are conducted in uncontrolled airspace.

103.13 Operation near aircraft; right-of-way rules
(a) Each person operating an ultralight vehicle shall maintain vigilance so as to see and avoid aircraft and shall yield the right-of-way to all aircraft.
(b) No person may operate an ultralight vehicle in a manner that creates a collision hazard with respect to any aircraft.
(c) Powered ultralights shall yield the right-of-way to unpowered ultralights.

103.15 Operations over congested areas
No person may operate an ultralight vehicle over any congested area of a city, town, or settlement, or over any open air assembly of persons.
103.17 Operations in certain airspace
No person may operate an ultralight vehicle within Class A, Class B, Class C, or Class D airspace or within the lateral boundaries of the surface area of Class E airspace designated for an airport unless that person has prior authorization from the ATC facility having jurisdiction over that airspace.

103.19 Operations in prohibited or restricted areas
No person may operate an ultralight vehicle in prohibited or restricted areas unless that person has permission from the using or controlling agency, as appropriate.

103.20 Flight Restrictions in the Proximity of Certain Areas Designated by Notice to Airmen
No person may operate an ultralight vehicle in areas designated in a Notice to Airmen under 91.141 or 91.143 of this chapter, unless authorized by ATC.

Notice: Effective October 11, 2001, 103.20 is amended as follows (per Federal Register page 66 FR 47378):

No person may operate an ultralight vehicle in areas designated in a Notice to Airmen under § 91.137, § 91.138, § 91.141, § 91.143 or § 91.145 of this chapter, unless authorized by:
(a) Air Traffic Control (ATC); or
(b) A Flight Standards Certificate of Waiver or Authorization issued for the demonstration or event.

103.21 Visual reference with the surface
No person may operate an ultralight vehicle except by visual reference with the surface.

103.23 Flight visibility and cloud clearance requirements
No person may operate an ultralight vehicle when the flight visibility or distance from clouds is less than that in the table found below. All operations in Class A, Class B, Class C, and Class D airspace or Class E airspace designated for an airport must receive prior ATC authorization as required in 103.17 of this part.

<table>
<thead>
<tr>
<th>Airspace</th>
<th>Flight Visibility</th>
<th>Distance From Clouds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Class B</td>
<td>3 statute miles</td>
<td>Clear of clouds</td>
</tr>
<tr>
<td>Class C</td>
<td>3 statute miles</td>
<td>500 feet below</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,000 feet above</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2,000 feet horizontal</td>
</tr>
<tr>
<td>Class D</td>
<td>3 statute miles</td>
<td>500 feet below</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,000 feet above</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2,000 feet horizontal</td>
</tr>
<tr>
<td>Class E - Less than 10,000 feet MSL</td>
<td>3 statute miles</td>
<td>500 feet below</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,000 feet above</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2,000 feet horizontal</td>
</tr>
<tr>
<td>Class E - At or above 10,000 feet MSL</td>
<td>5 statute miles</td>
<td>1,000 feet below</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,000 feet above</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 statute mile horizontal</td>
</tr>
<tr>
<td>Class G - 1,200 feet or less above the surface (regardless of MSL altitude)</td>
<td>1 statute mile</td>
<td>Clear of clouds</td>
</tr>
<tr>
<td>Class G - More than 1,200 feet above the surface but less than 10,000 feet MSL</td>
<td>1 statute mile</td>
<td>500 feet below</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,000 feet above</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2,000 feet horizontal</td>
</tr>
<tr>
<td>Class G - More than 1,200 feet above the surface and at or above 10,000 feet MSL</td>
<td>5 statute miles</td>
<td>1,000 feet below</td>
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<tr>
<td></td>
<td></td>
<td>1,000 feet above</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 statute mile horizontal</td>
</tr>
</tbody>
</table>