# A STUDY GUIDE

for the oral portion

of the Powered Parachute Practical Test

It was created by a student of Chuck Wales some time ago

and follows the PTS quite well.

**AREA OF OPERATION: CERTIFICATES AND DOCUMENTS**

1. ***Certificate Privileges***, Limitations FAR 61.315

Basically, the regulations say that if you hold a sport pilot certificate:

- You may act as pilot in command of a light-sport aircraft
- You may share the operating expenses of a flight with a passenger, provided the expenses involve only fuel, oil, airport expenses, or aircraft rental fees. You must pay at least half the operating expenses of the flight.

***Certificate Limitations*** (complete list is located in FAR 61.315)

You may not act as pilot in command of a light-sport PPC:

- That is carrying a passenger or property for compensation or hire
- For compensation or hire
- In furtherance of a business
- While carrying more than one passenger
- At night
- In Class A airspace
- In Class B, C, D airspace unless you have proper logbook endorsements
- At an altitude of more than 10,000 feet MSL or 2,000 AGL whichever is higher
- When the flight or surface visibility is less than three statute miles.
- Without visual reference to the ground
- Contrary to any limit on your pilot certificate or medical certificate, or any other limit or endorsement from a authorized instructor
- Contrary to any operating limitation placed on the airworthiness certificate of the aircraft being flown.

***Limits to how you fly your PPC can be found***:

- Driver's License
- Chute placard
- Pilot Operating Handbook
- Operating Limitations on the Aircraft
- FAR 61.315

***Documents on Person*** to Legally Fly Your LSA:

- Pilot's License – or Student Pilot License
- Driver's License or FAA issued Medical
- Government issued Photo ID
- Logbook if you are exercising specific endorsements (like flying in Class B airspace or flying your Cross Country Solo while training)

***Currency Requirements***

- Your pilot certificate never expires but in order to exercise the privileges of your certificate you must participate in a Flight Review every 2 years. This consists of one hour of ground school – guided by FAR 91, and one hour of flight with a CFI rated in PPCs. The CFI then endorses your logbook stating you have taken a Flight Review and you're good for another two years.
  Your first Flight Review will be two years after you have passed your checkride!!!

- If you desire to carry a passenger, you must log in your logbook 3 takeoff and landings to a full stop within the previous 90 days.

2. ***Medical Eligibility*** FAR 61.303

- You may act as a pilot in command of a light-sport aircraft if you hold a FAA issued medical certificate or a driver's license.
  You must comply with any limitations placed on your driver's license while you pilot your light-sport aircraft.
- IF you do not hold a driver's license or FAA medical you can act as pilot in command of a glider (sailplane) or hot air balloon (lighter than air). Neither of these aircraft require a medical to fly.

You must also confess to any known medical condition that would hinder you from safely piloting your aircraft.

3. ***Pilot Logbook or Flight Records***. FAR 61.51

***You must log in your logbook***:

- time flown to obtain a new or additional rating. This time must be signed off by a qualified CFI.
- (if you desire to carry a passenger) 3 takeoffs and landings within the previous 90.
- a Flight Review taken every two years.
- any endorsements that allow you to exercise additional privileges such as flying in Class B, C, or D airspace
- As a student pilot, your logbook will contain endorsements for you to fly solo, solo cross country, take a written test, or allow you to take your checkride among other endorsements

## 4. *Locating and Explaining*

***Paperwork required on the aircraft "AROW"*** (in a clear plastic pouch behind seat)

Airworthiness Certificate

- This certificate is issued by the FAA after the aircraft has been inspected and is found to meet the requirements of 14 CFR Part 21 and is condition for safe operation.
- Must be displayed on the aircraft so everyone who uses the aircraft can reference it
- The certificate goes with the aircraft when sold unless it is sold to a foreign buyer
- It is issued as a Special Airworthiness Certificate when it applies to light-sport aircraft and is always pink
- It can be a Special Light Sport Aircraft (S-LSA) or Experimental Light Sport Aircraft (E-LSA)
- This certificate is valid forever provided the aircraft has undergone an Annual Inspection performed by an authorized party (A&P, or if you have taken a short course - yourself – but only for your own aircraft) if your aircraft is an Experimental Light Sport Aircraft. And this inspection is logged in the aircraft maintenance log.
- Or in the case of a Special Light Sport Aircraft an Annual Inspection performed by an authorized party (A&P, or if you have taken the long course – yourself- but only for your own aircraft) or if the S-LSA is used for training or lease a 100 hour inspection performed by an authorized party. And this inspection is logged in the Aircraft Maintenance Log.

Aircraft **R**egistration CFR 47.41

- This document provides evidence that the aircraft has been officially registered with the FAA
- It is issued to the aircraft owner
- It is valid unless the aircraft has been sold to a foreign entity, cancelled by the owner, the aircraft has been destroyed or scrapped, ownership is transferred (new owner will get a new registration from the FAA), or the present owner has lost their US citizenship.
- This document must be renewed every three years

## Operating Limitations

- These are issued when the airworthiness certificate is issued
- These limitations are specific to the aircraft
- These are good as long as the Airworthiness Certificate is valid
- If you have an E-LSA you may have two sets of Operating Limitations – Phase I and Phase II. Phase I refers to the initial testing phase of your experimental aircraft to insure it is safe to fly. Phase II becomes effective when the Phase I hours have been flown off and the logbook endorsed. If you seriously modify your experimental aircraft you may have to return to Phase I operations until you are sure the modifications are sound and the aircraft is safe.
- Often times the limitations are a copy of FAR 61.315
- Other times they are created by the manufacturer and have specific aircraft limitations defined and are also contained in the Pilot Operating Handbook
- Limitations cover weight and balance, powerplant, flight limits and other pertinent issues

### Placards

- These are signs on the aircraft that have a direct bearing on the safe operation of the aircraft.
- They are located in conspicuous places and their information is often reproduced in the Operating Limitations or Pilot Operating Handbook or they may have been produced based on a Safety Directive
- They range from "Solo Front Seat Only" to "Passenger Warning" to "Minimum Fuel Octane 91" etc.

### Instrument Markings

- Each instrument, flight control, and switch must be marked so their function and use is readily identified.
- *If an instrument is not working and is not required for the safe operation of the aircraft, it must still be labeled "**INOP**" before flight is commenced*
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## Weight and Balance

- This document is produced by the manufacturer and contains information such as maximum gross weight, empty weight, CG settings, minimum front seat weight, etc.
- The information is also available in the Pilot Operating Handbook

## AREA OF OPERATION: AIRWORTHINESS REQUIREMENTS

### 1. Required Instruments And Equipment

- The Operating Limitations and Pilot Operating Handbook will list required instrumentation or equipment needed for the safe operation of your PPC
- If any of these items are "INOP" a flight should not be considered until they are fixed by an appropriately rated A&P mechanic or yourself if you have taken the appropriate training.
- If an instrument is not operative but is not required for the safe operation of the flight you may consider a flight but must label the inoperative instrument "INOP" until it is repaired

Example:

You get to field and the battery is dead. You could consider starting the engine by turning the prop by hand. (Yikes!) The magnetos still work and will supply power to provide the spark needed to run the engine. However, none of your instruments will work because they run off the battery. If you have an alternator they might come to life after the engine starts but let's suppose you do not have such an item - before you fly, you must take a piece of masking tape or some other labeling material – write 'INOP" on it and put it over your EIS window. You will not have any engine instruments, or perhaps altimeter, or vertical speed indicator but these are not listed by the manufacturer as minimum equipment to safely fly your aircraft. However, even though you're legal doesn't mean this is a great decision.

### 2. ***Safety Directives*** FAR 91.327

- Are issued when a component on your light sport aircraft needs to be changed or repaired based on a defect that affects the safe operation of your aircraft
- Safety Directives are issued by the manufacturer and not the FAA
- *They are mandatory for S-LSA aircraft but not for E-LSA* – however, you should really consider repairing something on your experimental that the manufacturer says needs to be repaired if you are going to safely leave the ground!
- Will list tools required, parts needed, whether it is going to be a complicated repair, who is qualified to perform the repair, detailed instructions, and inspection and test methods
- Safety Directives take the place of Airworthiness Directives for light-sport aircraft

3. ***Maintenance/Inspection Requirements*** and Appropriate Record Keeping

- E-LSA – Annual Condition Inspection must be recorded in the aircraft maintenance log ---- performed by A&P or owner if having taken a maintenance course qualifying them to do repairs on their own aircraft ---- performed every 12 months
- S-LSA – Annual Condition Inspection must be recorded in the aircraft maintenance log ---- performed by A&P or owner if having taken a maintenance course qualifying them to do repairs on their own aircraft ----- performed every 12 months or if aircraft is utilized for training - every 100 hours

**AREA OF OPERATION: WEATHER INFORMATION**

**1. Obtaining weather information**

- Utilize Flight Service (800) WX-BRIEF – this provides weather information, NOTAMS affecting your airport or route of flight, relays information on TFRs that might be in effect, you are also on record for researching the weather for your flight
- You can utilize the internet – Ryancarlton, Weatherunderground, Blastvalve…
- Regardless of what these sources tell you, you must see what is happening on the field!
- *Reference weather material* – lapse rate – High/Low Pressure-Warm/Cold Fronts-Isobars and their indication of wind speeds-define favorable weather parameters

**2. Making an informed "*Go/No-Go*" decision based on the weather**

- Note regional weather and its movement
- Note winds aloft and on the surface
- Note the short term forecast
- Weigh your skill in relation to the anticipated effects of weather on your flight

- Note ***Density Altitude***

- Pressure altitude adjusted for temperature
- Compared to a normal day 29.92 @ 59 degrees F at sea level
- Higher the Density Altitude the less performance from all components of the aircraft – less horsepower – less lift – less thrust
- Longer take-off roll – lower climb rate

- Take all of these factors and look at your field.....
    - Field length
    - Length of grass – higher grass grabs wheels longer take-of roll
    - Obstructions
    - Rough or smooth field?
- **Go/No-Go Decision based on all the above factors**
- If "Go" where is your reject point? – the point where you can reject the take-off and roll to a safe stop
    - A reject is based on the criteria that you have not only lifted off but **also have a positive rate of climb**

3. ***Inadvertent entry into IMC*** – adverse weather

- Must have 3 miles visibility and reference to the ground
- Reduced visibility = Reduced safety
- Flight into rain or storms introduces the possibility of turbulence – sometimes severe
- If you inadvertently fly into a IMC (instrument meteorological conditions) (clouds – fog- etc.) immediately execute a 180 degree turn to get out
- If possible descend but be cautious of obstructions
- If not comfortable with that decision – climb until you are on top – FARs allow for the pilot in command to vary from any regulation if they must do so for the safety of flight

**Weather Study**

- Weather is caused by the uneven heating of the earth
- Winds flow clockwise around a High Pressure area
- Winds flow counter-clockwise around a Low Pressure Area
- Warm Fronts are slow moving – stable winds-but long periods of reduced visibility due to fog or drizzle
- Cold Fronts are fast moving – violent weather-thunderstorms
- Isobars link areas of equal pressure on a weather map – the closer they are on the map the higher the wind - the further apart they are the lower the wind
- We want a forecast showing High Pressure in the area with Isobars far apart!
- ***Lapse Rate*** – the rate in which the air cools as we increase our altitude..... 2 degrees C or 3.5 degrees F per 1,000'
- ***Dewpoint*** – the temperature at which the air becomes fully saturated with moisture and it condenses
- *When the temperature and dewpoint are within 3-4 degrees you can anticipate fog*

**AREA OF OPERATION: CROSS COUNTRY FLIGHT PLANNING**

1. **Before flight the PIC shall become familiar will all available information concerning the flight.**

    - Must include information on available current weather reports and forecasts
    - Study any NOTAMS in effect and check the Airport/Facility Directory.
    - Appropriate current sectional chart or charts should be included, Terminal Area Charts
    - Refer to Pilot Operating Handbook (specific to aircraft) for proper loading, fuel consumption, and center of gravity information.
    - Be aware of terrain you are flying over and be prepared:

        - Hiking Boots for mountainous regions; survival blanket;
        - Flotation device for over water flying
        - Cold weather gear, water supplies, compass, protein bars, etc.

    - Reference electronic sectionals Ex.: www.airnav.com

2. **Identify airspace, obstructions and terrain features.**

    - Class A Airspace-above 18,000' MSL
    - Class B Airspace – solid blue
    - Class C Airspace – solid red
    - Class D Airspace – Double, "doghouse". Has blue hash line as well as numerical figure inside a dashed square.
    - Class E Airspace – dashed red
    - Class E Airspace with floor at 700ft is outlines in shaded Magenta - G airspace is directly below it.
    - Class E Airspace – outlines by shaded blue with floor at 1200ft or greater - G airspace is directly below it.
    - Terrain features include lakes, higher altitude areas depicted by darker shaded color, as well as yellow indicating large cities.

    - ***Minimum Safe Altitudes***

        - any altitude where if the engine fails you can safely land without damage to person or property
        - Over congested areas 1,000' over the highest obstacle and 2,000' horizontal clearance from that obstacle.

    - ***Cloud Clearances***

        - Class G – Clear of Clouds
        - Class E – 1/5 of 2 1,000' above – 500' below-2,000' horizontal

- ***Minimum Visibility***

    - 3 Miles and visibility to the ground
- Selects easily identifiable enroute checkpoints as appropriate.

- Use pilotage to navigate by landmarks or checkpoints (found on sectionals) combined with dead reckoning,

- Checkpoints are prominent features common to the area of flight, readily identified and if possible select as boundaries to maintain the course inside the brackets.

- Never place complete reliance on a single checkpoint.

- Selecting favorable *Cross Country Altitudes* considering weather conditions and equipment capabilities.

- If flying above 3,000' AGL and on a Heading of 000-179 fly at odd thousand feet plus 500 Ex. 5,500'
- If flying above 3,000' AGL and on a Heading of 180-359 fly at even thousand feet plus 500 Ex. 4,500'

- Selects appropriate frequencies for communication and information

- On sectionals the AWOS, ATIS or ASOS radio frequencies are identified at airports for surface weather or terminal information.
- 122.8 Unicom or Common Traffic Advisory Frequency - CTAF
- **121.5 Emergency Frequency**

- Applies NOTOMS, A/FD and other flight publications.

- NOTOMS are issued every 28 days
- A/FD will supersede sectional if any information varies.
- Flight Service will notify of NOTAMS or TFRs

- Completes a navigation plan and simulates filing a VFR flight plan.

- Flight plan not required but is good practice as can be used to aid in search and rescue.

- Calls Flight Service with the plan at 1-800-WX-BRIEF. Close flight plan upon arrival

- ***Lost Procedures*: 6 Cs**

  - Confess
  - Climb
  - Circle
  - Conserve fuel
  - Communicate
  - Comply

## 3. SPORT PILOT PRIVILEGES APPLICABLE CLASSES OF AIRSPACE

- **Class B** - Surface to 10,000ft. Cannot fly as Sport Pilot unless have received training and have logbook endorsed by certified instructor ref. FAR Part 61.

- **Class C** - Surface to 4,000ft. Cannot fly as Sport Pilot unless have received training and have logbook endorsed by certified instructor ref. FAR Part 61.

- **Class D** - Surface to 2,500ft. Cannot fly as Sport Pilot unless have received training and have logbook endorsed by certified instructor ref. FAR Part 61.

- **Class E** - Surface or for transition into airport airspace Class E starts at 700ft or 1200ft. A Sport Pilot can fly in this airspace with no additional training needed. Cloud clearances must be 500ft below, 1000ft above, and 2000ft horizontal from clouds.

- **Class G** - airspace that is considered uncontrolled and goes from the surface to700ft. or 1,200ft or higher depending on sectional depiction. A Sport Pilot can fly in this airspace with no additional training needed. Cloud Clearances must be clear of clouds.

## 4. SPECIAL USE AND OTHER AIRSPACE

- Cannot enter prohibited areas denoted by a blue box with cross hatch lines as well as a P-XX number.

- Restricted areas include artillery firing, aerial gunnery and guided missiles. Denoted by a blue box with cross hatch lines as well as a R-XX number. Can enter if the restricted area is considered joint-use however is dangerous.

- Military Operation Areas (MOA) are not restricted to Sport Pilots however exhibit extreme caution. It is the responsibility of both military and civilian pilots to avoid collision. Contract the controlling agency for traffic advisories before entering.

- Other airspace areas include parachute jump areas, national security areas, chartered US Wildlife Refuges. In AIM, pilots are ***requested*** to fly 2000ft above the park area but it is not required or else it would be a published FAR regulation.

## 5. TEMPORARY FLIGHT RESTRICTIONS

- TFRs are published in NOTAMS and must be abided by Sport Pilots.
- Includes natural disasters, forest fires, sporting events, Presidential visit.
- Flight Service is the best source for current TFRs – or internet

**AREA OF OPERATION: OPERATION OF SYSTEMS ( Define 3 )**

1. Canopy/Riser System and Control System

   - The wing/canopy is an airfoil that consists of a top skin, bottom skin and ribs, which allow for pressurization of the cells. The canopy provides the lift necessary for flight by allowing varying pressure to travel above and below the airfoil.

   - Riser straps connect the airfoil/canopy to the cart at the riser attach point brackets. With appropriate CG set, the cart will suspend below the canopy appropriately – front wheel approximately 4-6 inches higher than the main wheels.

   - The control system consists of steering bars connected to steering lines. These 5 or more lines connect across the real left and right edges of the trailing edge of the parachute. By pushing the left steering bar the line tightens causing the trailing edge to be dipped down thus starting a left turn.

2. Engine instruments include a fuel gage, engine speed tachometer, engine and oil temp gauges and flight instruments include altimeter, vertical speed, and airspeed indicators.

3. The landing gear consists of three wheel assemblies, ground steering system, braking system, lightweight tires and some shock absorption.

4. The engine and propeller produce thrust which propels the PPC and charges the electrical system to power the avionics instruments. Typically a PPC has a 4-stroke engine due to reliability, fuel economy, longer engine life, and higher horsepower ranges.

5. Fuel is deposited in the fuel tank prior to flight and preferably right after landing from the previous flight. This reduces any airspace that is in the tank thus reducing the opportunity for condensation to form in the tank. Auto fuels are used due to lower levels of lead.

6. The oil system on a 4-stroke engine provides lubrication for the engines moving parts, cooling of the engine by reducing friction, removing of heat from the cylinders, providing a seal between the cylinder walls and pistons, and carrying away contaminants.

7. The electrical system consists of a generator/alternator, battery, battery switch, voltage regulator and associated wiring. The engine driven alternator provides constant electricity to the electrical system which on a PPC powers the aviation lights, avionics instruments, electronic fuel pump etc.

8. There are two magnetos which supply an electrical charge to the spark plugs. They work via a set of magnets on the drive shaft of the engine. These in turn supply a current to two set of diodes which store the charge until it is released to fire the spark plugs. This system is completely independent of the battery which means you can start the engine even if the battery is dead by propping the engine or pulling the pull start cord. It is vital that you insure the Mag switches are off before you turn the prop. If one is on the system could move the prop while your hands are in close proximity.

9. The coolant system is either air cooled or liquid cooled. Air cooled the air is pushed around the engine shroud by a cooling fan with baffles to route the air. In a liquid cooled system, coolant is pumped around the cylinder head and routed through a radiator that radiates the heat.

10. Avionics and auxiliary equipment includes GPS, instrument controlled systems etc.

AREA OF OPERATION: AEROMEDICAL FACTORS

1. Effects of alcohol, drugs and over the counter medications.

   - Alcohol impairs the efficiency of the human mechanism. Drinking alcohol results in impaired judgment, decreased sense of responsibility, affects coordination, constricts visual field, and reduces attention span among other effects. Less than .04 and more than 8 hours since last drink.

   - Drugs negatively effect coordination, ability to make calculations and increase anxiety.

2. Symptoms, causes, effects and corrective actions of at least 3 of following.

   - **Hypoxia** is caused by the inefficient availability of oxygen while flying to high of altitude in a PPC. The effects of hypoxia are headache, blue finger nails headache, decreased reaction time, visual impairment. The corrective action is to either remove yourself from the lack of oxygen environment or to supplement with oxygen while in flight. Supplemental oxygen is required for the PIC after 30 minutes above 12,500 or any time above 14,000'. Supplemental oxygen is to be available for passengers above 14,500

- **Hyperventilation** is caused by emotional stress, fright or pain resulting in increased depth and frequency of breathing. This results in a depletion of CO2 from the body, which can lead to unconsciousness. The effects are headache, decreased judgment time, euphoria or visual impairment. Restoring proper levels of CO2 in the body is the corrective action achieved by either breathing into a bag, or simply reducing breath frequency.

- **Middle ear and sinus problems** are caused by climbing or descending in an aircraft. The cause is the pressure differential between the outside of the body and that of the air inside the middle ear and sinus areas. The effects are eardrum pain, congestion, and sinus blockage and pain. This can be avoided by not rapidly ascending or descending as well as simply self grounding when a respiratory infection or allergic condition is known.
- **Spatial disorientation** is caused when visual cues are taken away from the brain due to IMC conditions false sensations can cause a pilot to become disoriented. Corrective actions include maintaining constant straight and level flight via the throttle and remove all control input to the steering controls.

- **Motion sickness** is caused by the brain receiving conflicting messages about the state of the body. Anxiety or stress can contribute to motion sickness. The effects are nausea, dizziness, paleness, vomiting and sweating. The corrective actions include focusing on an object outside the PPC and avoid unnecessary head movements.

- **Stress and fatigue** is caused by physiological demands placed on the body that have reached a significant level. The effects are increased metabolism, blood sugar increase, respiration increase and performance in flight decreases. Corrective action can include self grounding prior to flight if any known stress is in place
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- **Dehydration** is caused by the critical loss of water from the body with fatigue, dizziness and weakness as effects. Corrective action includes drinking more water to revert to proper water levels in the body.

- **Hypothermia** is caused by the drop in body core temperature. The effects include capillary shrinkage, bluish color skin, and shivering. Corrective action includes seeking shelter from elements through insulation with additional clothing.

## AREA OF OPERATION: PERFORMANCE AND LIMITATIONS

1. Effects of temperature, altitude, humidity and wind.

As air becomes less dese it reduces power because he engine takes in less air thrust because the propeller is less efficient in less air and lift because the thin air exerts less force on the airfoils. **Density altitude** is pressure altitude corrected for non-standard temperature. As altitude or temperature is increased the density altitude increases thus reducing performance. With higher density altitude more speed is required to obtain enough lift for takeoff, therefore requiring a longer ground run. It also causes the aircrafts engine, prop and airfoil to be less efficient thus reducing rates of climb and a greater ground run for obstacle clearance.

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- An increase in humidity increases density altitude thus reducing performance. Typically warm air holds more water vapor, while cold air holds less. Increased takeoff and landing distances are increased, as are climb rates. Differences in air density caused changes in pressure, resulting in motion in the atmosphere to form wind.

- Weather and wind is caused by the unequal heating of the earth's surface. Wind affects takeoff, landing and cruise flight operations by causing wind drift off course. With a PPC we must take off into the wind. A crosswind takeoff is not desirable.

2. Weight and center of gravity

- The center of gravity is within limits when the CG is properly balanced and the total weight is not exceeding the manufacturers recommended specs. Out of longitudinal balance as well as excess weight caused a loss of stability and control. The bracket settings on the CG plate allow for longitudinal adjustments of the quick links. Nose high= too back heavy. Nose low = too front heavy. CG position on the CG plate is determined by the pilot's weight and the quick links are set to the right numbers.

3. High winds can increase or decrease the ground speed of the PPC while making a downwind or upwind turn. Because the aircraft is affected by wind drift, a gradual turn will be drifted off course easy if not corrected during the turn by adding to the tightness of the turn when turning downwind. When turning upwind there is a tendency for the PPC to drift inward so a more gradual turn is desired. For tighter turns an increase in throttle is required in order to maintain the same altitude due to loss of vertical lift. If making maneuvers close to the ground as much as a third flare could be desirable to counteract downdrafts by immediately adding additional flare to lift you back to desired height.

**AREA OF OPERATION:** PRINCIPLES OF FLIGHT

1. Aerodynamics with respect to steering.

    - Steering lings control the yaw about the vertical axis. Connected to the outboard trailing edge on each side of the wing and deflect the trailing edge of the parachute downwards when pulled, causing more drag.

2. Propeller/engine torque compensation

    - Torque on a PPC is made up of 3 components.

        a. Torque reaction from engine and propeller
        b. Gyroscopic action of the propeller
        c. Asymmetric loading of the propeller

    - A clockwise swinging prop will yaw to the left and a counterclockwise turning prop will yaw the aircraft to the right.. Most modern PPCs will counter this with riser length where one rise will be longer than the other.

3. The pendulum effect with a PPC exists because there is a displacement between the force of lift pulling the parachute up and the force of gravity pulling the cart down as a result of the risers. If there is an input on the parachute either by the Pilot or wind, the pendulum results in automatic return to stability after a slight swing.

4. Load factor effects in level flight and turns.

    - A load factor is the ratio of the total air load acting on a powered parachute to the gross weight of the powered parachute. A load factor of 3 means a total load 3 times its gross weight. A 1.5 load factor is required of all PPC by Code of Federal Regulations. The load factor is directly increased as a result of an increase in angle of bank for a turn. Lift and weight are the two main forces in place during level flight.

5. Wing flaring is achieved by pulling both the steering lines at the same time, as a high-lift technique used during takeoffs and landings. It increases the airfoil chamber resulting in a significant increase in lift, increased drag, and increased angle of attack. One second prior to landing engage the necessary flare temporarily decrease speed and increase drag to cause a softer landing. Additionally it raises the nose of the aircraft temporarily to ensure the rear tires touchdown first.

6. Improper chute rigging is characterized by the following:

    - Tying off a steering line shorter to correct for a poorly balanced machine, improper lateral balance by improper length risers, improper longitudinal balance due to imbalance of CG, improper orientation or unequal length of steering lines, also contribute to improper chute rigging.

**AREA OF OPERATION: PREFLIGHT PROCEDURES**

1. Preflight Inspection

   - The preflight inspection is essential to the safe operation of the PPC. The use of checklists is imperative to not forgetting important elements and to develop a standardized routine for regularly checking all necessary components prior to flying. Visual inspection of components should be conducted as soon as you approach the aircraft.

2. The walk around will consist of:

   - cart inspection
   - powerplant inspection
   - equipment check
   - engine warm-up (YELL "CLEAR PROP")
   - wing and suspension line inspection.
   - Risers are properly attached and correctly ORIENTED. The chute must be properly trimmed aka lines are correct lengths and properly attached.
   - Verifies the powered parachute is in condition for safe flight.

AREA OF OPERATION: CANOPY LAYOUT

1. Inverted method – best method to allow for clear inspection of the bottom of the wing, allows for propeller blast to travel over the chute, keeping it from inflating early. It pulls the A lines before the other lines resulting in quick inflation of chute.
   DOWNSIDE- the suspension lines are very slack allowing for increased chance of pressure knots to form/does not handle much wind before it will billow

   **Stacked method** – best method for easily inspecting all the suspension lines as they are stretched out from the cart. DOWNSIDE – air from the propeller can blow up the wing prematurely/lines are in the grass and can be snagged by weeds

2. A line over is when the suspension line instead of going straight from the riser system to the attach point on the chute – rather takes a trip over the parachute first ( it will look as if the line is under the fabric ). Thus when the chute kites up the line will cause the chute to be pinched. If a line is twisted in with other lines and seems to go under the fabric, it's a sign a line over.

3. Demonstrate canopy and riser are laid out properly and in condition to inflate.

4. Demonstrate the ability to untwist a twisted canopy line.

5. Verify the suspension and steering lines are not tangled

AREA OF OPERATION: **ENGINE WARM-UP AND STARTING**

1. Demonstrate engine start and warm up procedures - USE CHECKLISTS!!!!!!

2. Position PPC properly considering structures, surface conditions and safety of surroundings. (Nose pointed to container to prevent forward movement during engine warm up)

**AREA OF OPERATION: COCKPIT MANAGEMENT**

1. Brief the passenger on how to use safety belt, shoulder harness, method of egress and other emergency procedures. Explain the communication system as well as where to place their hands and feet. In case of emergency keep all limbs inside the cart. PIC must wear seatbelt at all times during takeoff, landing and in flight. Shoulder harness can be taken off during flight.

**AREA OF OPERATION: TAXIING ( CANOPY INFLATED ) - LANDING**

1. Position the PPC so that it is directly facing the upwind direction.

2. During taxi with the canopy up be sure to have a **LOC** *( Lines are clear, Cells are Open, and Chute is centered) (on takeoff )*
3. Demonstrate direction for 100 ft and avoid other aircraft.

4. Upon landing complete these 4 things:

   - Release any flare to ground the cart easier.

   - Close throttle if taxi without parachute inflated

   - Ignition system should be shutdown. Left to right (MAG 1, MAG2, Key off, EIS off)

   - Parachute needs to be collapsed by tugging on the steering lines across chest.

## AREA OF OPERATION: BEFORE TAKEOFF CHECKS

1. Perform the before takeoff check. Ensure engine is operating properly and the chute lines are going away from the prop.

2. Review takeoff performance, takeoff distances, departure and emergency procedures. Consider runway length, set a "Go/No Go" point on the runway (wind sock).

3. Position the aircraft directly into the wind

4. Engine temp must be appropriate prior to flight.

5. Ensure the powered parachute is in safe operating condition.

6. Avoid runway incursions and insure no issues with traffic.

## AREA OF OPERATION: AIRPORT OPERATIONS

1. **Radio Communications**

   - How to communicate with airports without operating control towers.
   - Who you are talking to
   - Use Unicom – to get info on the weather, runway preference etc Find frequency on sectional
   - other traffic at the airport

***Announce***

   - Where you are
   - Who you are (PPC with N-number xxxx)
   - What you want – announcing position or asking for report on wind
   - Where you are again

## 2. Traffic Patterns

- Regulations require than PPCs avoid the flow of fixed-wing aircraft. Unless indicated the default pattern is all left turns. If there is no tower it is the responsibility of the Pilot to determine direction of traffic pattern.

- Standard pattern is 45deg entry to *Downwind Leg* then turn left for *Base Leg* then turn left again for *Final.* On departure the left turn is the *Crosswind Leg*. Wake turbulence can be avoided by landing beyond an aircraft that landed in front of you. During takeoff behind, have a higher climb rate.

- Comply with local traffic pattern procedures.

- Maintain proper spacing from other aircraft.

- Correct for wind drift to maintain the proper ground track.

- Maintain orientation with the runway/landing In use.

- Maintain traffic pattern altitude +- 100 ft. (That altitude at Mike's is 250 ft.)

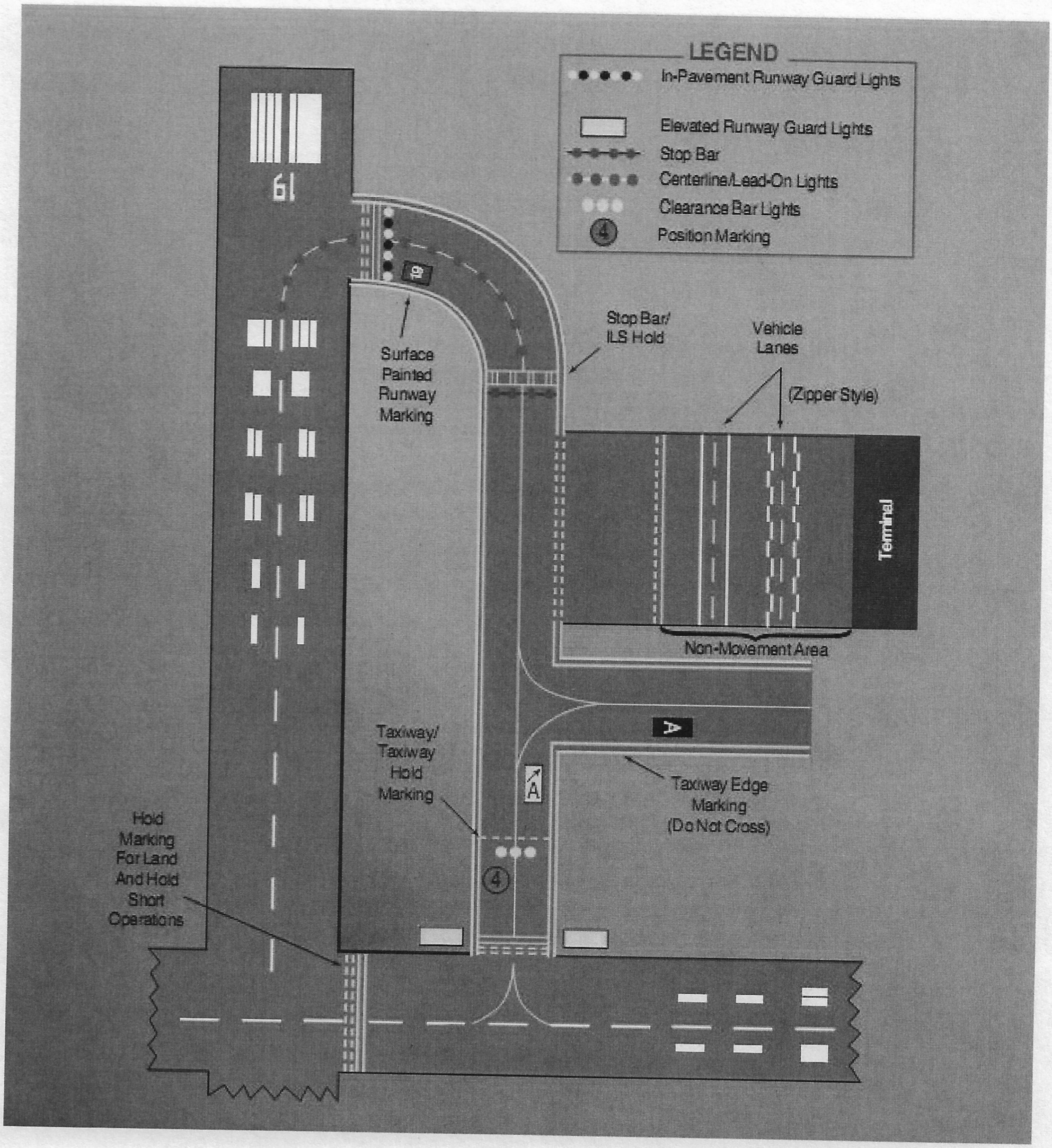
## 3. Airport Runway Markings and Lighting

- Taxiway identified with continuous yellow centerline stripe.

- If dashed an aircraft may use that area of the runway. The solid lines are where the aircraft are to hold. (4 yellow lines two solid two dashed)

- Vehicle roadway markings when observed will help avoid unnecessary contact with other vehicles at airport marked as a solid while line on edge and dashed line to identify lanes.

- Airport lighting may include an omnidirectional beacon where white and green mark civilian land airports. Approach light systems (visual glideslope indicators) do not apply to PPC.


LEGEND
In-Pavement Runway Guard Lights
Elevated Runway Guard Lights
Stop Bar
Centerline/Lead-On Lights
Clearance Bar Lights
Position Marking
19
Surface Painted Runway Marking
Stop Bar/ ILS Hold
Vehicle Lanes
(Zipper Style)
Terminal
Non-Movement Area
Taxiway/ Taxiway Hold Marking
Taxiway Edge Marking (Do Not Cross)
Hold Marking For Land And Hold Short Operations
A
4

AREA OF OPERATION: TAKEOFFS, LANDINGS, & GO-AROUND

1. Normal **Takeoff and Climb**

- A normal takeoff will be headed into the wind and the wind is light to moderate. Takeoff surface is firm, clear of debris and sufficient in length to ensure there is normal lift-off, climb out speed, and no obstructions along the takeoff path.
- Clear the area – yell " CLEAR PROP"
- Divide attention inside and outside the cockpit.
- Smooth appropriate throttle.
- Check canopy for LOC (**Lines** are clear, cells are **open**, chute is **centered**)
- Maintain full power until 300ft
- Maintain direction control and proper wind-drift correction throughout takeoff and climb.

2. Normal Approach and Landing

- Normal approach consist of the following attributes
- engine power is available
- Wind is light or final approach is into the wind
- Final approach path has no obstacles
- Landing surface is firm
- Level and of ample length to gradually bring PPC to a stop
- Adequately survey the landing area during *Base Leg*.
- Consider wind direction by doing a flyover of the center of airfield at 250ft to inspect windsock for ground wind direction and speed. Select a suitable runway based on wind direction.
- Reduce power once entering the *Base Leg* to begin decent.
- Maintain a stabilized approach. (Put end of runway directly between the front bars and reference the ground below but focus on end of runway)

- Make smooth, timely, and correct control application. Flare occurs during the last 1 second before landing. Adjusting the flare to the rate of descent is imperative. Once the PPC has touched down throttle back immediately and release the flare to lower the front of the aircraft.

- Maintain directional control through the approach.

- Once in a straight line down runway and all wheels have touched down initiate shutdown of the motor and immediately pull in the canopy lines to deflate quickly.

### 3. Go-Around/Rejected Landing

- When a landing is not sufficient then a go-around is warranted. Issues that could cause a rejected landing is unexpected appearance of hazards on runway, overtaking another PPC, wake turbulence, or unstabilized approach.

- The earlier the condition that warrants a go-around/rejected landing is recognized the safer it will be.

- Apply takeoff power immediately

- Maneuver to side of runway to avoid conflicting traffic if appropriate.

- Maintain full throttle until at 300ft altitude.

- Maintain directional control and proper wind-drive correction through the climb.

## AREA OF OPERATION: PERFORMANCE MANEUVER

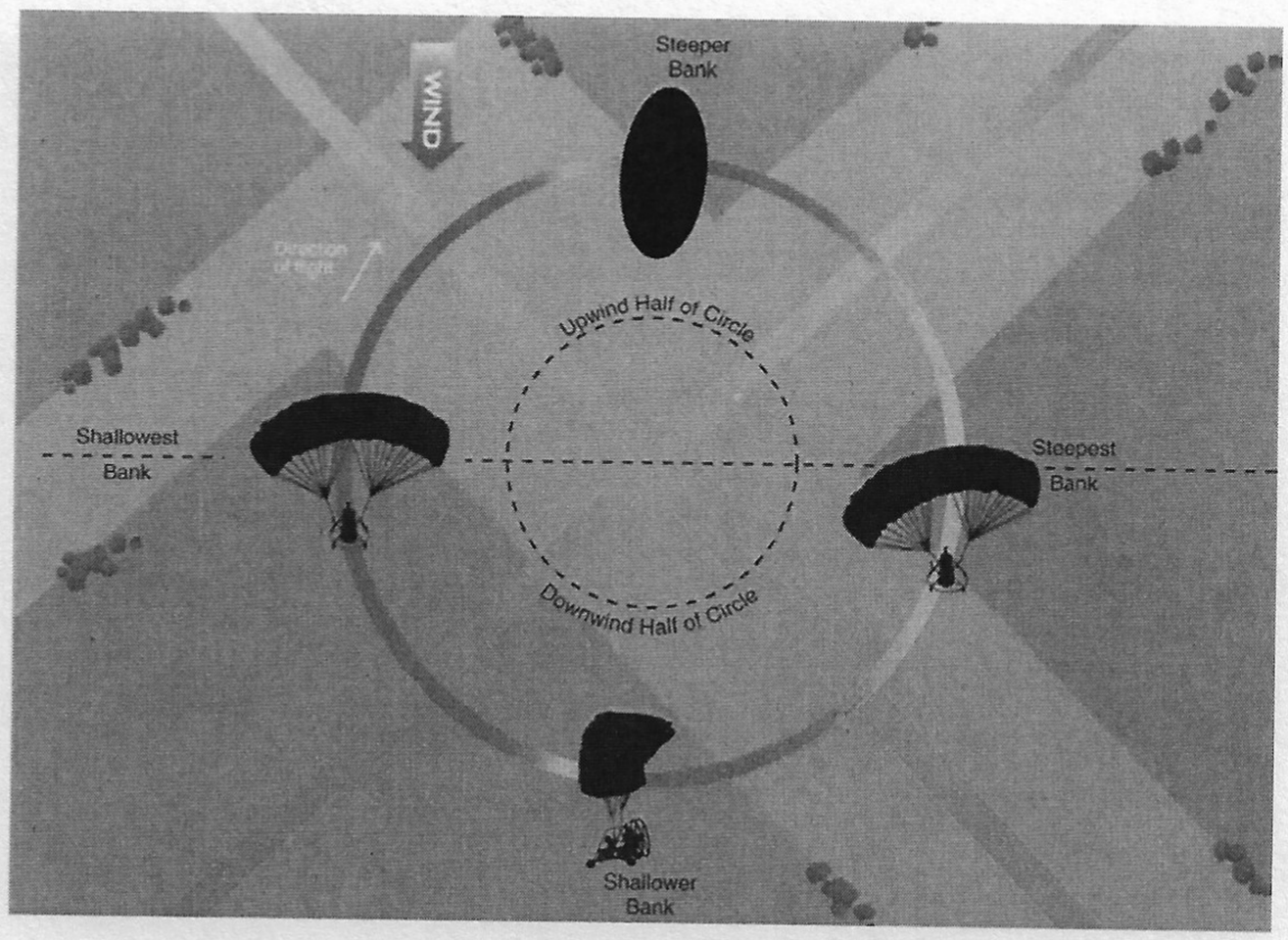
### 1. Constant altitude Turns/Turns to a Heading

- In this maneuver, pick a point on the horizon (ok this is on the "ground" but NOT right beneath you) and use that as you're starting and ending point.
- It can be a house, mountain peak or other easily recognizable object. This is what you use to guide you as you roll out & end the maneuver.
- You must start and end within 10 degrees of this point (of course, who has a compass-it's not required equipment). The PTS says you should do turns in both directions.
- **ALWAYS PERFORM A CLEARING TURN BEFORE EACH MANEUVER** +/- 100 ft. Never drop below 200 feet AGL

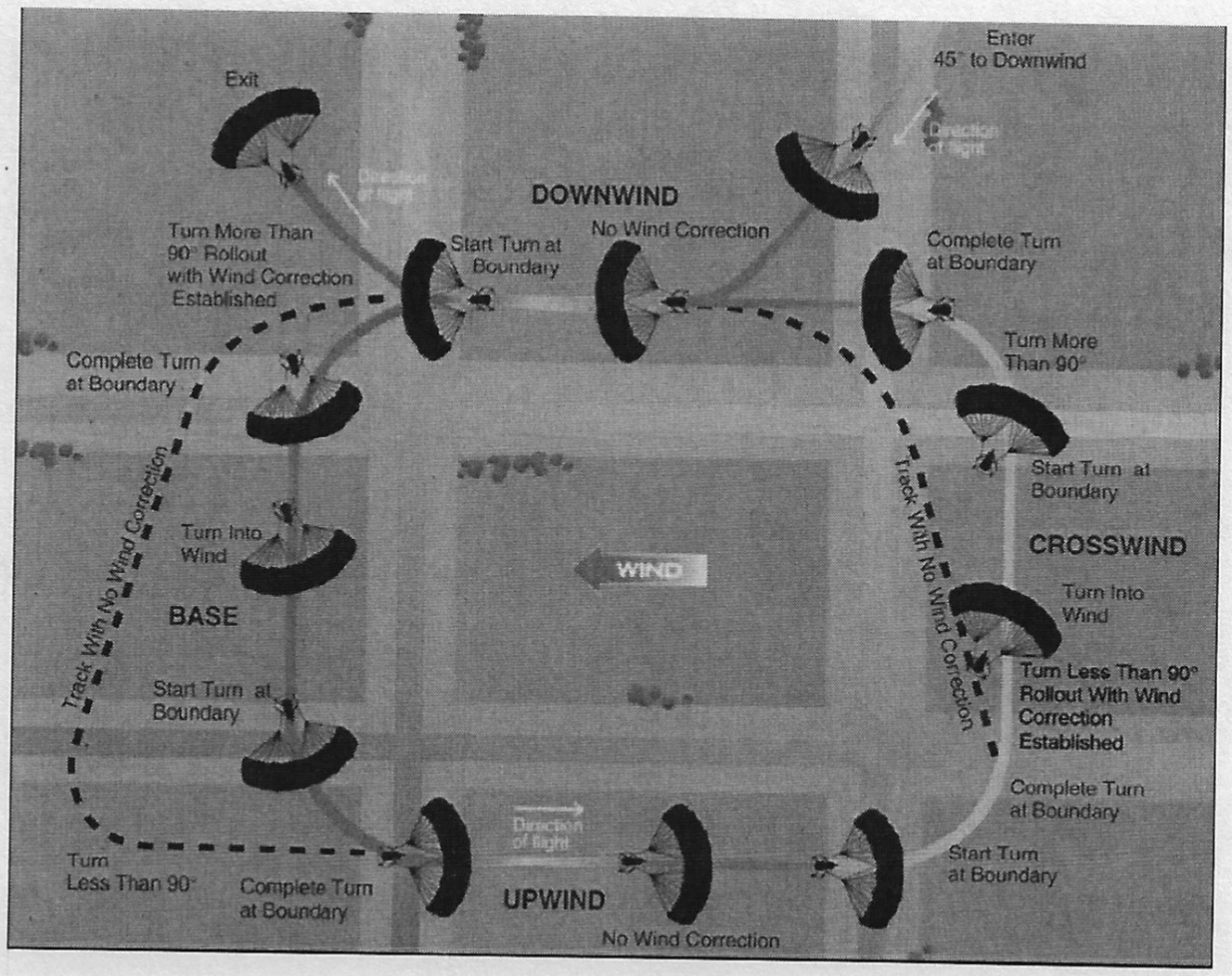
AREA OF OPERATION: GROUND REFERENCE MANEUVERS

- **ALWAYS PERFORM A CLEARING TURN BEFORE EACH MANEUVER** +/- 100 ft.
  Never drop below 200 feet AGL

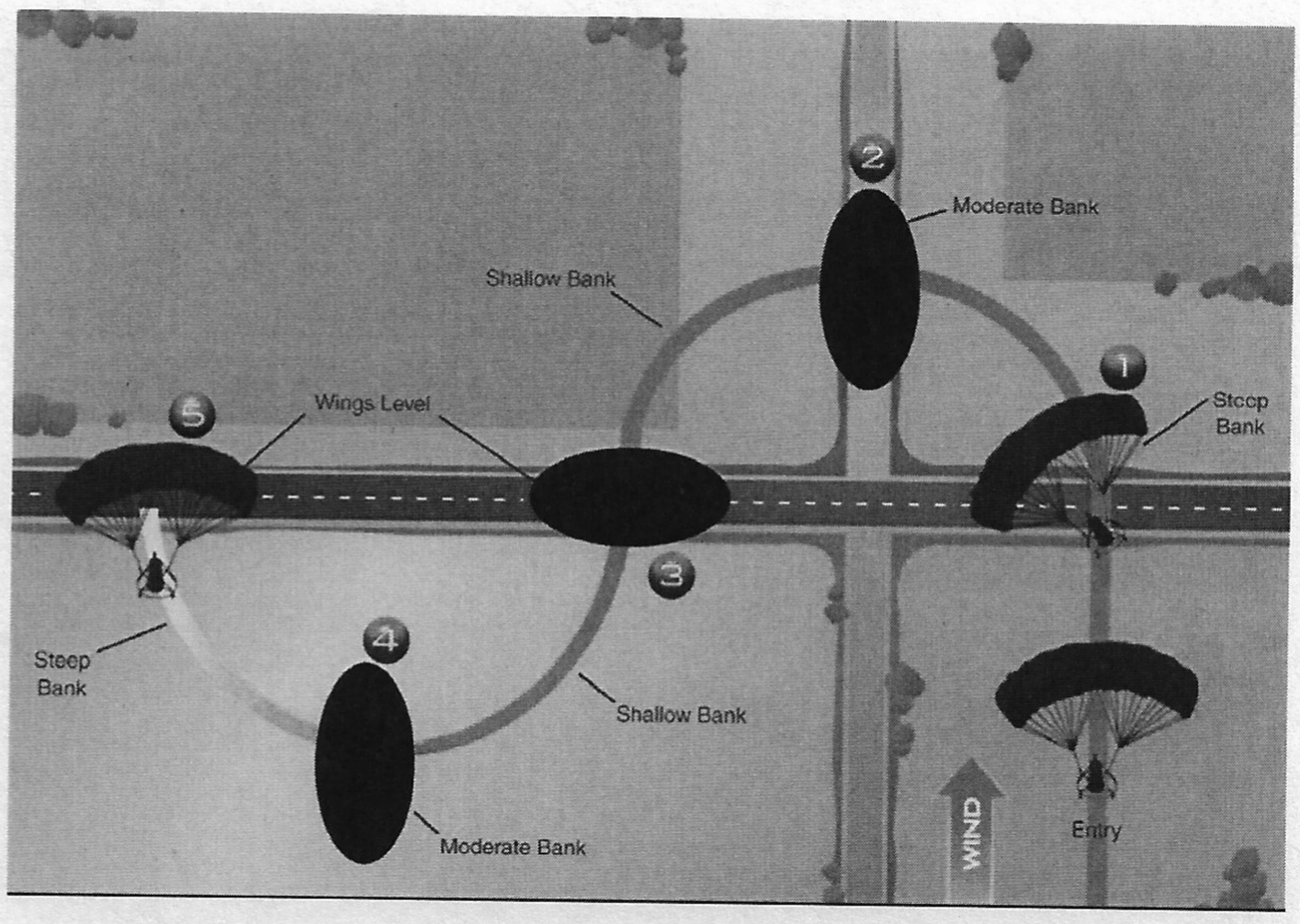
## 1. Turns Around a Point

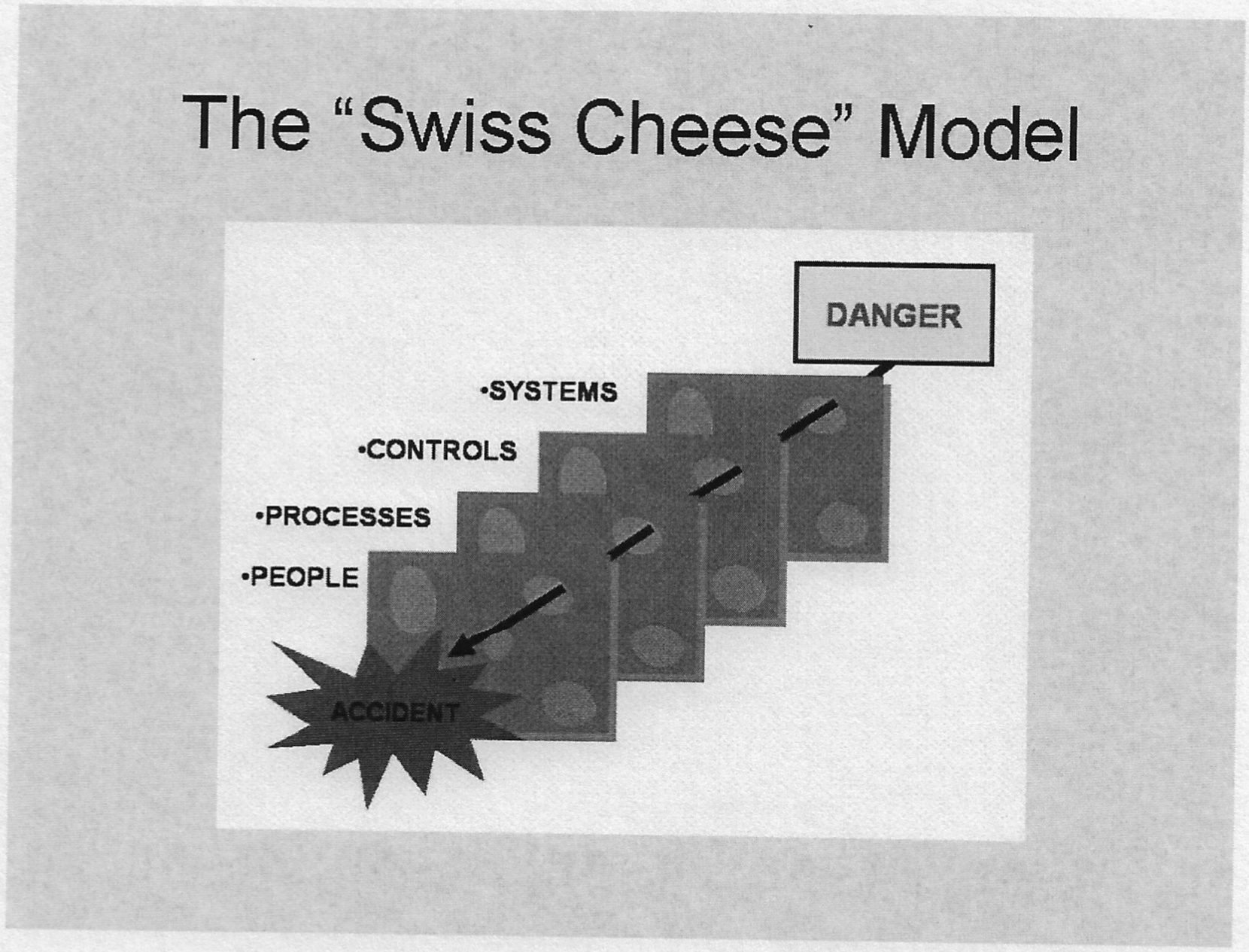



## 2. Rectangular Course



## 3. S-turns


2
Moderate Bank
Shallow Bank
1
Steep
Bank
5
Wings Level
3
4
Steep
Bank
Shallow Bank
Moderate Bank
WIND
Entry


The "Swiss Cheese" Model
DANGER
•SYSTEMS
•CONTROLS
•PROCESSES
•PEOPLE
ACCIDENT