

BEGINNING FLIGHT (P1)

PART 1: Intro to Paragliding

Why fly?



Events

National

International

Coupe Icare



Types of flying

Sledding

Obstacle soaring

Ridges

Buildings

Dunes

Thermal flying



Cross-country

Vol biv



Competition



Tasks

Distance

Acro



Launch types

Foot launch

Winch

Car



Boat

Balloon

Paragliding and You

Physical aspects

Mental aspects

Good judgement

Spatial judgement

Concern for personal safety

Ability to make reasonable decisions

A bit of self-confidence (not too much)

Positive attitude

Will and desire to fly

Fear and danger

Flying involves risks

Risks can be managed

Fear is normal

Should be manageable

Helps us fly safely within our limits

Practical learning progression

Organizations

USHPA

CIVL

From Past to Present

Historical perspective

*1

*2

*3

*4

*5

*6

*7

Paragliding realized

PART 2: Wings and Gear

The Wing

The Wing



*1

*2

The lines

*3 and 4 riser systems

Overall arrangement

The Harness

The Harness



* Live demonstration

* Conventional

Open

Pod

* Acro

Open only

* Hike and fly

Open

Pod

* Safety concerns

Spinal protection mousse

Airbag

* The reserve

* Reserve containers

Single

Dual

* The Reserve

* Design types

* Round Apex

Single canopy

Double canopy

Rogallo

Square

* Paraglider Care

* Environmental damage

Laying wing on sharp objects

Sitting on packed glider

Harsh chemicals and dirt

Excessive exposure to sunlight

Exposure to water and damp storage

Pulling on snagged lines

Excessive heat

* Handling abuse

Never step on glider or on lines over rocks

Avoid allowing leading edge to hit the ground

* Other Equipment

* Helmets

* Full face

* Back

* Round

* Conical

* Open face

* No windshield

* Windshield

* Shoes and gloves

Boots for ankle support

NO open lacing hooks

Running shoes are fine during training

Gardener or mechanic gloves are advised even in warm weather

* Instruments

Radio

Airspeed indicator

Altimeter

Variometer

* PART 3: Why it flies

* Relative wind

* Airspeed, windspeed and groundspeed

*1

*2

* How wing takes and maintains its shape

*1

*2

*3

*4

* Creating Lift

* The Airfoil

Wing profile

Lift

Angle of attack



*Lift and drag

*1

*2

*In-depth explanation of lift

Right-click open outside Mindjet

Right-click open outside Mindjet



*The Effect of Forces

*Angle of attack

*The Balancing Act

*Speed Control

Trim speed

*Changing speed

*Stalls

*1

*2

*3

*A good turn

Roll, Pitch, and Yaw

*1



*2

*PART 4: Flight Familiarization (Practical)

*Unpacking, Laying out and Packing

Spreading your wings

Clearing the lines

Horseshoeing the canopy

Packing the glider

*Reverse Setup

*Putting on the harness

Attaching the risers – reverse position

Carabiner hookup

*Preflight check



*Sequence

*The harness

Harness straps

Leg straps

Buckles

Harness pack cloth

Seat

Both carabiners

Back support

*Reserve parachute

Handle

Position

Bridle

*The lines

All lines

Control lines

Control line pulleys

Control line toggles and knot

*The canopy

Risers

Riser quick links

Fabric damage

Canopy debris

Layout (lineover)

*Electronics

Vario/GPS

*Radio

Turned ON

Correct frequency

Check radio input/output

*Requirements

Thoroughness

Organized system

Uninterrupted process

Correct deficiencies

*Reverse Inflations

Straight arm arrangement

*Building a wall

Reverse inflation

*Stopping and dropping the canopy

Sorting out a canopy

Carrying the glider

Self-spreading

*Forward inflation

Attaching the risers

Lofting the canopy

Stopping the canopy

*Ground Handling

Fore and aft control – kiting

Side-to-side controls

Riser control

*PART 5: Your First Flights

*Preparing to be a pilot

Proper attire

Physical effort

Mental preparation

At the site

*Watching the wind

*1

*2

*Into the air

Pre-launch check

*The launch

*1

*2

Imaging practice

*In flight

Sitting down

Steady flight

*Speed corrections

*Speed control

*Landing

*Performing a PLF

*Finishing the flight

*More handling tricks

Inflation tips

Turn corrections and controls

Learning turns

Tandem flying as a student

USHPA Beginner rating

*NOVICE FLIGHT (P2)

*PART 6: The Nature of the Sky – Weather for Paragliding

*Meteorology

*The atmosphere

Planet's atmospheric model

*Thermal structure of the atmosphere

*Atmospheric pressure changes with altitude

*Heating Earth's Surface and Atmosphere

*Daily paths of the sun

*Sun's angle and energy reaching surface

*Reflection and absorption vs ray angle to surface

*Characteristics of the solstices

*Three mechanisms of heat transfer

How heat is transferred
How thermals are formed



The electromagnetic spectrum

Solar radiation absorbed vs reflected

Reflection and scattering

Albedo of different surfaces

Light scattering and effect on sun color

Heat budget of Earth and atmosphere

Daily cycle of incoming solar radiation

Comparison of temperature scales

Moisture and Atmospheric Stability

Earth's hydrologic cycle

Water vapor required to saturate air at various temperatures

1

2

The Dry Adiabatic Rate

Adiabatic just means assumes no heat, mass or momentum pass across the air mass container

Dry vs Wet Adiabatic Rate

1

Effects on humidity

Mechanisms that cause air to rise

*

Orographic lifting and its effects on air

Frontal wedging

Convergence

Localized convective lifting

Environmental lapse rate

Absolute stability

Absolute instability

Conditional instability

Evidence of unstable conditions

Conditions

Properties of water

Daily lapse rate cycle

Inversion capping thermal height

Thermals in a ground inversion

Thermal clouds with and without an inversion

Weak thermals on a stable day

Raising and elimination of inversion over mountain

Inversion layer

Airflow over a mountain in varied stability

Forms of Condensation and Precipitation

Cloud types and altitudes

Cloud classification according to form and height



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* High clouds

- Cirrus
- Cirrostratus
- Cirrocumulus



* Middle-altitude clouds

- Altostratus
- Altostratus
- Lenticular



* Low-altitude clouds

- Nimbostratus
- Cumulus
- Stratocumulus
- Cumulonimbus



* Precipitation types and temperature profiles

* Virga

* Hailstone formation

* Clouds

* Air mixing inside cloud

* Cloud tops

* What the clouds tell us about wind speed

* Stability indications

* Cloud streets

* What they look like

* Cloud streets in and out of phase

* Lift and sink pattern

* Cloud street mechanics

* Air Pressure and Winds

* Average air pressure at sea level

* Comparison of atmospheric pressure in inHg and mbar

* US standard atmosphere

* Air density vs temperature

* Isobars

* 1

* 2

* Formation of a sea breeze

* Friction vs Wind Speed

* 1

* 2

* Cyclonic vs anticyclonic airflow

* 1

* 2

* 3

* What it looks like from the ground

* Quick quiz

* Circulation of the Atmosphere

* Scales of Atmospheric Motion

* How breezes are generated in mountain and ocean site



* 1

* 2

* 3

*Global circulation model

*The Jet Stream

*1

*2

*3

*4

*5

*Mid-latitude Cyclones

Air masses

Observing weather from the ground



*Air Masses

*

*Storm generated by a cold front

*Idealized structure of a midlatitude cyclone

*Warm fronts

*Fast-moving cold front

*Occluded fronts

*1

*

*1

Cold type occluded front

Warm type occluded front

*2

*Thunderstorms and Tornadoes

*Thunderstorm development stages

*1

*2

*Well-developed Cb tower diagram

*Roll clouds

*Cross-section of a supercell thunderstorm

*Thunderstorms and effect of inversions

*Cloud-to-ground lightning

*Mesocyclone and tornado formation

*Downbursts

*Thunderstorms

*The building and mature stages of a thunderstorm

*Tilting of a thunderstorm increasing downdraft severity

*Thunderstorm gust front

*Production of a thunderstorm bench

*Escape routes

*Lightning in thunderstorm

*Dissipating stage of a thunderstorm

*Climate

*Koppen system of climate classification

*1

*2

*3

• Effects of temperature on humans

• Heat effects

• Cold effects

• Judging Conditions

Wind strength

Wind direction

Wind and turbulence

• Lifting Air

Slope or ridge (dynamic)

• Thermal

• Thermals

• A hill thermal trigger

• Cumulus cloud life cycle

• Cloud shapes as thermal ages

• Changes in rising thermal

• Cross-section of an ideal thermal

• Drifting thermals and repeating thermals

• Daytime and evening thermals

• Multiple cores in a thermal

• Mixing, lift and sink around a thermal

• Repeated source thermal in wind

• Thermal tilt in wind

• Thermals in turbulent layer

• The death of a thermal

• Strongest thermals rise highest

• Upslope breezes trigger thermals

• Variable ground winds under thermal

• Thermals located at high ground points

• Thermal clouds appear to cover the sky

• Thermal drifting in wind

• Wind breaking up a thermal

• Thermal in wind triggering a new thermal

• Thermals collected by mountain

• Thermal tilt near a slope

• Thermal height and size changes throughout the day

• Thermals creating dust devils

• The nature of a dust devil

• Variations in surface conditions

• Convergence lift

• 1

• 2

• Wave lift

• Waves

• Conditions for wave generation

• Lenticular and roll clouds associated with waves



- Constructive and destructive wave interference

- Foehn gap as evidence of wave production

- Lift and sink areas of wave

- Wave action behind an isolated hill

- Waves downwind from a plateau

- Turbulence

- Turbulence Types

- Mechanical Turbulence

- 1

- 2

- 3

- Shear Turbulence

- Thermal turbulence

- Wing tip vortices

- Effects of wind speed on turbulence

- Rain-induced turbulence

- Broader hills and turbulence

- Flow and turbulence in a valley

- Flow and turbulence in a gap

- Rotor on the lee side of a mountain

- Turbulence behind ridge tops

- Turbulence downwind of a plateau

- Turbulence on different hill faces

- Orientation near the ground

- Forecast sources

- Websites

- Windydy.com

- XCSkies.com

- Weatherspark.com

- Windguru.com

- Apps

- Windfinder

- Sailflow

- PART 7: Perfecting Takeoff Skills

- Takeoff Perfection

- Takeoff review

- Solving launch problems

- Aborting a launch

- Launch Conditions Variations

- Calm winds, Tail winds, High altitude

- Crosswind technique

- Turbulent and switchy winds

- Stronger winds

- High wind reverse inflation

- Turn around emergency procedure

- Windy assisted launches

- Light wind assistance

- Launch Slope Variations

- Effects of terrain on lift and sink

- Flow irregularities on ridges

- Localization of lift in a cross-wind

- High-mountain canyon flow

- Effect of ridge shape variation

*Ridge lift created by cloud barrier

*Magic air and wonder winds

*Locating lift from cloud appearance

*Maximum lift as slope angle and wind speed changes

*Variations in lift in different slope and wind angles

*Concave vs Convex slope heating

*Venturi

* In a gap



* Another gap

* Above a ridge

*Variations in ridge lift

*Variations in the soarable envelope

*Wind gradient up a ridge face

Flat slope launches

*Steep slope launches

*Launches from flat to steeper

*Windy cliff launches

Rough terrain

*PART 8: Perfecting Landing Judgement

*From Final to Flare

*The four phase final

Landing final and flare



*1

*2

*3

*4

*Troubleshooting landings

*1

*2

*Wind gradient

Wind gradient



*1

*2

*Landing approach



*Figure-8 approach



*Potential problem

S-turn approach



U-Turn approach



Judging final height

*Preventing setup and approach problems

Doing 180deg S-turns instead of Figure Eight

Turning too often

Turning too slowly

Waiting too long to turn on final

Not centering on final approach

*The aircraft pattern

*1

*2

*3

*4

*Boxing the field

*Landing setup rules

*Landing Variations

*Wind factors

Calm winds

Strong winds

Switchy winds

Downwind landings

High altitude landings

Crosswind landings

*Turbulent landings

*Landing on slopes

Uphill landings

Downhill landings

Side slope landings

*Landing in varied ground cover

Rough ground landing

Landing in high weeds or crops

Emergency landings

Landing in traffic

Accuracy landings

Big ears in landing

Obstructed landings

The Last Act

*PART 9: Learning Novice Skills

*Comfortable Flying

*Easy chair flying

*Controlling oscillations

*1

*2

*Harness adjustment

*Speed Control

Slow speed

Glide ratio

Flying speed & Speed to fly

*Best glide speed

*1

*Polar curve

*2

*Speed system

*Stall and Spin Control

*Full stall

*Deep stall

*Spins

*Performing Turns

*Turn types

*Efficient turns

*1

*2

*Weight shift turns

Ending a turn

Rear riser turn

Performing 360's

Diving turns

Spirals

Spatial judgement

*Clearing turns

*Turn practice



turn practice

*Flying in More Wind

*Wind effects

*1

*2

Wind limits

*Penetration

Gliding with headwind



Gliding with tailwind



*1

*Venturis

*1



*2

*Turns in wind

*Flying in Turbulence

*Active flying

*Wing deflations

*Controlling a deflation

*Frontal deflation

Turbulence security position

*Big ears

*Flying with Big Ears

Removing Big Ears

*Flying Higher

*The site

*The launch

*The landing

*Dive syndrome

*Judging obstacle clearance

Planning a flight

Busy sites

Flying at altitude

*Risk management

USHPA Novice Rating

*INTERMEDIATE FLIGHT (P3)

*PART 10: Rules of Flight

*Rules to Live By

*Launching rules

Perform a leg strap check just before inflation

Assess conditions carefully before launching

Never launch in a tail wind

Do not fly in strong conditions

*Limit the crosswind component acceptable for launch

30deg for ridge soaring

45deg in light winds

Check the wing before committing to the air, every time

*In-flight rules

Never fly with inadequate rest, or under the influence of drugs or alcohol

Maintain proper airspeed at all times

Clear all your turns and obey the right-of-way rules

Avoid high traffic areas

Do not add more than one new thing at a time

Always remain within reach of a safe landing field

As a beginner or novice don't turn towards the hill

Make all turns efficient or intentionally diving

Use proper safety equipment and procedures

Try new equipment at the training hill first

Exercise extreme caution in widespread lift greater than 500fpm (2.5m/s)

Never fly near thunderstorms or into clouds

*Landing rules

Plan to arrive at your landing field with at least 300ft (100m) of altitude above the ground

Below 300ft (100m) remain within a 45deg angle (1:1 glide) of your landing field
Use a downwind, base and final approach in winds below 8mph (13km/h); use a figure 8 approach in higher winds
When on final approach, increase your speed to offset wind gradient
Flare to a no-step landing in most conditions
Never fly alone

*Emergency Procedures

Airsickness
*Helmet and harness problems

Control and canopy problems
*Tree landing

Power lines
Still water landing
Surf and moving water landing
*Getting blown back

*Getting dragged

*Parachute deployment

Don't hesitate. Better to use it than lose it
Look at the handle
Reach for the handle
Extract the chute by pulling it strongly out of the harness
Look for the clear air away from the wing
Throw it mightily in the direction of the turn
Pull back bridle and rethrow if it hasn't opened. Jerk it hard if the bridle has extended but the bag remains closed
*Once deployed, pull the wing in by pulling a line, then pull from the material to gather it in a bundle



Remain motionless so you don't start oscillations
About 10ft (3m) above the ground, prepare for a PLF
If high winds are carrying you, be ready to cut the parachute bridle with a hook knife

*Courtesy Rules

Always respect a landowner's wishes
Leave all gates in the position you found them
Pick up all litter
Avoid landing on crops or with livestock
Obey site rules
Obey right-of-way rules
Help less experienced pilots
Sell your used equipment only to those capable of handling it
Maintain a positive attitude
Maintain pleasant public relations
Take a first aid course
Support your local school and instructors

*Right-of-way Rules

*General traffic rules



*1

When approaching head on with another glider, both gliders should turn to the right
When two gliders are converging, the pilot on the right has the right of way
When overtaking another glider, pass to the right
The lower pilot has the right-of-way
Do not fly directly over or under another glider with less than 30ft (10m) clearance
Paragliders (and hang gliders) in the US must yield right-of-way to all other aircraft except powered ultralights
Clear all turns by looking carefully in the direction toward which you intend to turn

*Soaring rules

*When ridge soaring, the glider closer to the ridge has the right of way

When approaching head on during ridge soaring, the pilot with the ridge to his right has the right-of-way
When ridge soaring, the low pilot has the right-of-way
*When ridge soaring, always turn away from the hill when reversing directions

When ridge soaring, a glider overtaking another glider flying the same direction should pass between the ridge and the glider being overtaken

*When thermaling, the low glider has the right-of-way

*When thermaling, the first pilot to enter the thermal establishes the turning direction for all pilots entering that thermal

When thermaling, the person in the thermal has the right of way

*Flying with hang-gliders



*Federal Aviation Rules (FAR 103)

*Applicability

Single occupancy
Recreation purposes only
Airworthiness certificate

*Weight limits

< 155lbs

*Inspection requirements

Must allow FAA official inspect your glider

*Waivers and certificates

To deviate from FAR 103 must obtain a waiver

*Hazardous operations

Prohibits flying or dropping objects, if a hazard is created to persons or property

*Daylight operations

Can only fly from sunrise to sunset

*Right-of-way rules

Paragliders must yield to all aircraft except powered ultralights and hang gliders (which are equal to us)

*Congested areas

Prohibits flying over a congested area of city, town, or settlement or an open air assembly of persons

*Operation in controlled airspace

*Forbidden in

*Controlled airspace

* Any airspace where some rules apply
A, B, C, and D airspace

*

* Class A

anywhere above 18,000ft (5,500m) MSL

* Class B

around busy airports

Looks like an inverted wedding cake

* Class C

like B, but lower

* Class D

cylinder of 5mi (8km) radius and 2,500ft AGL around medium traffic airports

* Class E

controlled airspace usually 1,200ft above the surface

designated in areas of likely air traffic

* Class F

currently no Class F

* Class G

uncontrolled airspace where we can fly with the least requirements (cloud clearance)

* Prohibited areas

found around national security areas

* Restricted areas

found around military activity areas

* Flight planning

* Pre-flight

XCPanner

Skyvector

* During flight

* Instruments

XCSoar

FlySkyHigh

* Visual reference with the surface and cloud clearance

Must maintain visual reference with the surface at all times

Means you cannot fly into clouds or even above stratus layer or extensive fog bank

* Cloud clearance requirements

* Uncontrolled airspace

* Below 10,000ft

2,000ft horizontal

500ft below

1,000ft above

* outside controlled airspace

* Above 10,000ft

one statute mile horizontal

1,000ft below

1,000ft above

* Below 1,200ft

remain clear of clouds

visibility must be at least one mile

* Controlled airspace

* Below 10,000ft

at least 3 miles of visibility

* Above 10,000ft

at least 5 miles of visibility

* NOTAMS

Notices to airmen

May restrict airspace in the vicinity of important personages or public events

* PART 11: More about equipment

* Glider Construction, Care, and Repair

Canopy construction

Line construction and strength

Canopy care and repair

Line care and repair

* Replacing lines

- *Buying Your Own Equipment

- New or used
- What to look for
- Inspecting a glider
- Test flying and transitioning
- Control line adjustment

- *Your New Harness

- Selecting a harness
- Parachute position

- *Parachutes

- Parachute types
- Parachute care and function

- *Instruments

- Variometers
- Altimeters
- GPS
- Airspeed indicator

- *Safety Equipment

- Helmets
- Protective footwear
- Hook knife

- *Risk management

- *PART 12: How our wings work

- *Performance Factors

- *The airfoil

- *Flight angles

- *Lift, drag, and glide angle

- *Forces on an airfoil

- *Lift and drag

- *Drag types

- *Parasitic drag

- *Induced drag

- *Wing tip vortices

- *Wing loading effects

- *Design effects

- *Shape and size

- *Aspect ratio

- *General idea

- Area

- Number of cells

- *Lines

- Sheathed or unsheathed

- Lengths

- *Materials

- *Durability

- Mechanical abrasion

- UV resistance

- Weight

- Weight range considerations

- *Paraglider Stability

- *The control axes

- *Pitch stability

- *Roll stability

- *Yaw stability

- *Turn Effects

- *How a turn works

- *Elements of a turn

- *Effect of a turn on angle of attack

- Turn limits

- *PART 13: Soaring! Intro to Intermediate skills

- *You, the Pilot

Recurrent training

Decision making

Fear of flight

The intermediate syndrome

*Flying New Sites

Judging safety

Flight procedures

Model behavior

*Flying in Traffic

Turns in traffic

Judging traffic

*Learning to Soar

*The story of soaring

*Lift produced on various hill shapes

*Effects of vertical moving air

Soaring qualifications

Soaring turns

*Ridge soaring steps

Practice sledding

On a smooth, light wind day try turning as soon after launch as you feel comfortable

Try launching in stronger winds

*The lift band on a long ridge

*Crabbing on a ridge

*Soaring paths

Soaring launches

*Ridge soaring problems

Turning too late on takeoff

Turning too often

Flying too far away from the ridge

Flying too slow or too fast

Gaps and breaks in the ridge

Getting too far back behind the ridge

Getting too far from your landing area

Flying too far along a ridge when it tapers off or when you have a crossing tail wind

Turing in sink

*Ridge soaring rules

Always perform your mental launch checklist

Always perform a fast, controlled launch

Always turn to head into a crossing wind after launch

Always maintain ample control speed when flying close to ridge to prevent unexpected turns and stalls

Always have a safe landing field well within reach

Never fly downwind from the top of the ridge when low

*Ridge soaring lore

*Best lift areas on a ridge with crossing wind

*Lift factor in bowls and gaps

*Venturi effect on a ridge

*Turbulent areas in ridge lift

*Landing on Top

*Safe top landings

*Pattern for landing on top

The crosswind top landing approach

*The downwind top landing approach

*Thermal Soaring

*What is a thermal

*Thermal cross-sections

*Responding to thermal lift

Thermal soaring qualifications

*Learning to thermal

*Searching for the best core

*Using figure eights to thermal when low

*Using a variometer

*Mapping the thermal

*Where to find thermals

*Thermal collectors and triggers

*Finding thermals from clouds

Thermal safety

*Thunderstorms



*Dangers

Paragliding Miracle



Cloud suck

Escaping cloud suck

Thermal rewards

USHPA Intermediate Rating (P3)