Proposed Paragliding Association of Kenya (KPA) Legislation and Training Syllabus

for

The Recreational Aviation Association of Kenya (RAAK), The Aero Club of East Africa, and The Kenya Civil Aviation Authority.

By

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Intro

Paragliding in Kenya has been a low profile sport for the past 20 years. Foot-launching without motors, pilots from all corners of the globe have come to experience the great free flying that Kenya has to offer. Myself and other friends have been enjoying flying the skies for over ten years and have a high level of experience in the field.

Kenya has held three FAI world records in Paragliding for cross country. Making it a highly recognised place to fly within the international paragliding community.

We want to promote safe paragliding for all pilots, other air users, and other people we come in personal contact with at ground level.

For years paragliding in Kenya has been unregulated. With very few paragliding accidents is a safe sport, when participated in an intelligent manner. Using common sense to maintain this safety has always been a high priority.

Paragliding pilots in Kenya want to continue to use the skies like we've been doing for many years.

Glossary of terms

FAI - FédérationAéronautique Internationale - The World Air Sports Federation, is the world governing body for air sports, aeronautics and astronautics world records.
Class O - Under the FAI, section for paragliding and hang gliding.
CIVL - International Hang Gliding and Paragliding Commission (FAI)
RAAK - Recreational Aviation Association of Kenya, Kenya's new Association responsible to all recreational airports in Kenya.
PAK - Paragliding Association of Kenya, under (RAAK)
IPPI - International Pilot Proficiency Information, Issued by FAI, Internationally recognised license (FAI), giving detail of a pilot's ability.
APPI - Association of Paragliding Pilots, and Instructors; International paragliding training association, issuing internationally recognised license. Para Pro - Paragliding pilot rating (FAI)

Overview

1. Proposed Training Syllabus

    -Brief Outline
        Elementary Training (Para Pro stage 1 & 2 Club Pilot Training (Para Pro stage 3)

    -Detailed description of Para Pro training syllabus Stages 1 to 5

    -Exams
        Proposed Theory Exam Questions (Examples)

2. Towing
    - General Guide

    - Towing Rules

    - Payout Winch

    - Towing Team Instructions

2. Licensing.
    - Licensing proposal for Kenyan paragliding pilots

4. Visiting Pilots
    - Rules And Regulations

    - Permits

    - Fees

5. Incidents
    -Reducing Incidents

    -Reporting Incidents

Training Syllabus.

All pilots who wish to fly in Kenya, who don't already hold a paragliding license, must complete the appropriate training and pass the exams set by the governing body. All students must pass all elements before they can be issued with a Kenya Paragliding License.

Split into two sections.

Elementary - This is the first stage a student will take in order to fly solo. Under the full supervision of an instructor, the student will gain the necessary skills, knowledge, experience and airmanship to take off and land safety.

Club Pilot - The next level up, it is the basic pilot level for autonomous flying. Having completed the Elementary course (Para Pro stage 1 & 2), the pilot will broaden their horizons. The Club Pilot rating is what is needed in order to fly solo, safety without instructor supervision.

A student must pass both parts in order to freely fly on their own.

Brief Outline of the different training phases each student will go through in order to pass for a Kenyan Paragliding License.

Elementary Pilot Syllabus
(Para Pro stages 1 & 2)

Phase 1: Ground training
1. Introduction talk
2. Site assessment briefing
3. Introduction to canopy and equipment
4. Avoiding/minimising injury

Phase 2: Ground handling
5. Briefing: pre flight checks 6. Preparation
7. Inflation
8. Directional control

Phase 3: First hops
9. Getting airborne

Phase 4: Flight exercises
10. Eventualities briefing
11. Commands and communications briefing 12. Responsibilities briefing
13. Flights (i) Maintaining course and airspeed 14. Flights (ii) Introducing turns
15. Flights (iii) Completing simple flight plans

Phase 5: Theory lessons and examination

16. Meteorology
17. Principles of flight
18. Rules of the air and air law 19. Elementary stage examination

Final assessment of Elementary Stage
20. The instructor will check that all the tasks for Elementary Pilot have been successfully completed, that the student has the right attitude to flying and has reached the standard of airmanship required.

Club Pilot Syllabus
(Para Pro stage 3)

Phase 6: Pre-soaring
21. Soaring theory
22. 180 degree turn
23. Planned approaches

Phase 7: Soaring
24. Soaring flight
25. Top landings
26. Flying with others

Phase 8: Improving skills
27. Exploring the speed range
28. Accelerator systems
29. Forward launching
30. Reverse launching
31. Weight shift and pitch-roll co-ordinations in turns 32. Cross wind and slope landings

Phase 9: Instability and emergencies
33. Theory Emergencies/ Instability 34. Active flying
35. Rapid descent techniques
36. Dealing with an asymmetric tuck

Phase 10: Theory lessons and examination
37. Meteorology
38. Principles of flight
39. Rules of the air and air law
40. General airmanship knowledge 41. Club Pilot theory examination

Final assessment for Club Pilot
42. Declaration by Senior Instructor that the student has successfully completed all the tasks for Club Pilot and has the right attitude and has reached the standard of airmanship required to fly safely and competently.

Detailed Training systems following the International Hang Gliding & Paragliding Commission (CIVL), set by the FAI.

PARA PRO

A PARAGLIDING SAFETY AND TRAINING ANALYSIS.

The history of paragliding has been written in a few years, where new barriers have been broken virtually every day. (Today it may suffer from a hard case of the "Icarus Syndrome".) It has developed into a full-blooded aviation activity, which means that it is no longer simple and easy to learn. It has become complex and potentially more dangerous for the "self-learners", while the opposite may be true for the ones that receive proper training.

In the race for more efficient gliders and new developments (high aspect-ratio wings, power, thermal and cross country flying), one seems to forget too often that human nature needs time to learn to perform new tasks in a safe manner. The training methods are very often on the "ground skimming level", while reality calls for cross country and thermal flying.

If one looks at the history of paragliding with respect to the levels of flying that have been reached (limited to foot launched, no power paragliding), we see 5 distinct stages, similar to those involved in flight in hang gliders. However, in paragliding, the lowest two levels are combined, due to the greater ease of takeoff and landing and lower flight speeds in paragliders.

Accidents are most likely to happen when the pilot takes the step up to a higher stage.

The 5 stages of paragliding:
1. GROUND SKIMMING
(Don't fly higher than you would care to fall!) (this stage is combined with stage 2)
2. ALTITUDE GLIDING
(Altitude and space to manoeuvre, no soaring)
3. BASIC SOARING
(Soaring in non turbulent conditions)
4. ADVANCED SOARING
(Soaring in turbulent conditions.)
5. CROSS COUNTRY
Each stage is followed by a more complex stage (a building block system) requiring new knowledge and skills. It is a natural "ladder" where a student should climb to progress safely in his paragliding career.

In addition to the stage system above, there are also other stages or steps a pilot may take, such as changing to another harness system, or learning to fly a new site or a new glider.

Each time new stages are pioneered, or are being reached by the "self learning" pilots, there are an increase in accidents. Some of those accidents are unavoidable because of the pioneering nature of it (Lillienthal was the first one), while others could have been avoided simply by proper training.

If one analyses why most accidents caused by "pilot error" happen, one finds that they happen either because the pilot tries to perform a task or meet a condition he/she is not able to master, or he/she simply does something that should not be done.

Today we have all the material necessary to avoid most such accidents, either by the knowledge the paragliding community has collected itself or by the available knowledge through other aviation activities. Either we know how a task should be performed correctly or we know that there are clear limitations that we cannot safely exceed. (One sample of the latter is cloud flying. Any sane motor or glider pilot knows that this is dangerous, and it is hence unnecessary for paraglider pilots to rediscover this fact by killing themselves).

Today, paragliding, along with other aviation activities, has most of the information needed to progress safely through the flying stages. All that is needed is to put all together in a training system.

Let us have a closer look at the model of the stages:

The 5 stages of paragliding:

Accidents are most likely to happen when the pilot takes the step up to a higher stage. A training system should be designed to smooth out these steps with a natural progression to higher pilot ability. We fill in these steps with instruction.

1. GROUND SKIMMING
(combined with stage 2)
2. ALTITUDE GLIDING
(Orange)
3. RIDGE SOARING
(Green)
4. THERMAL SOARING
(Blue)
5. CROSS COUNTRY
(Brown)

A PILOT'S ABILITY to fly paraglider can be broken down to 4 QUALITIES that we can develop:
1. Knowledge
2. Skill
3. Experience
4. Airmanship

SKILL: Since paragliding is a practical activity, a pilot's ability can best be measured by his skill, which means his way of performing manoeuvres, links of manoeuvres and tasks, and how he masters flying conditions and new situations. He certainly also must show good but that is not easily measured and difficult to diagram. A good instructor however is able to spot good airmanship often before the pilot is even in the air.

KNOWLEDGE and **EXPERIENCE** are only "tools" used to improve a pilot's **SKILL** and **AIRMANSHIP** and hence his **ABILITY** as a pilot. They are however of good value in the learning process and their value

as such can hardly be overestimated. Left alone by themselves they are meaningless in measuring the pilot **ABILITY**.

BASED on the above "facts" or statements, I have developed a training system, built on the **5 STAGES of PARAGLIDING** as a natural progression for a pilot. I have also based the system mainly on the development and measurement of the pilot's SKILL, although the other 3 qualities have found their place.

For instance, AIRMANSHIP is expressed by the fact that the pilot has either a STUDENT LICENCE, which means that he lacks the necessary AIRMANSHIP to take care of his own and others' safety, or he has a PILOT LICENCE, showing he has the necessary AIRMANSHIP. In other words, a student pilot is one that is under a training system, controlled by an instructor, and all his flying shall be in accordance with the instructor guidelines. A pilot licence shows that the holder is a pilot that is mature enough to take care of his own flying, seeking further instruction when he feels he needs it.

A pilot licence does not mean that the holder is someone that does not need more instruction because "he knows it all", but merely that he can take care of himself at the stage he is at. When he wants to progress to a higher stage he seeks instruction, before he goes out on his own flying at that stage.

THE COLOUR CODES (or "Black belt in Paragliding"): The stages in the system are colour coded for easy identification.

The idea is that the pilot (or student) will wear visible markings that identify him as a Student or a Pilot, as well as the stage he is on (signed off by an instructor). Apart from being a good site control system it has its values as a training aid. It is motivating and it gives the students and pilots insight in what they are up to by breaking down the way to the top into easily identifiable stages or blocks that seem attainable by most people.

Note: The stages are given colours from yellow to brown. A "black" grade or Master grade may be considered as the top level. This grade should express the ultimate in Airmanship, Skill, Knowledge and Experience.

PARA PRO, general description
The objective of this program is to aid and assist the participants to progress safely in, and enjoy, the sport of paragliding, and become true airmen.

Which means that they must be able to enjoy the beauty and freedom of the sport, and not risk injury or restrictions due to their own and others' lack of will and ability to take care of their safety, enjoyment and freedom.

The ability of an airman is based on knowledge, skill, experience, personal qualities and attitudes, which take time to develop to a standard where one is able to operate alone within the objective above.

T**he development of this ability** is a matter of education, which is done most efficiently, enjoyably and safely through a planned program which motivates the student and pilots by helping them to reach easily definable and natural stages or goals, which gradually expands the operational freedom without jeopardising safety.

THE PROGRAM

The program consists of 5 natural stages, based on the development of the sport, and which gives an excellent progression after the building block principle of learning. One progresses from the easy to the more difficult, from low to high, from basic to advanced, from simple to complicated, being careful not to leave any gaps on the way.

The program also divides the participants into students and pilots which indicated whether they are able to operate alone or not.

THE 5 STAGES

1, 2. Altitude gliding
3. Ridge Soaring
4. Thermal Soaring
5 Cross Country

PARTICIPANTS: Students:

Orange Student Green Pilot Blue Pilot Brown Pilot

A student pilot is as the name suggests under training to become a pilot. He is considered to have limited ability to take care of his own and other people's safety.
This means that he has not developed enough ability to evaluate all elements involved with regard to safety and based on this, make safe and sound decisions and act accordingly, without the supervision of an instructor.

Pilots:
A pilot should be able to take care of his own and other people's safety within applicable rules, regulations and code of good practice, while operating alone requires higher stages than they are rated for.

This means that he must be able to evaluate all the elements involved with regard to safety, and based on this make safe and sound decisions and act accordingly, on his own, or to obtain further instruction, information and assistance at his own discretion.

Recommended training and safety limitations
Students should always fly under the supervision of an instructor. Before all the rating requirements are met they should always fly under the direct supervision of an instructor.

Students should only fly paragliders and harnesses suitable for students and which on they have been checked out on by the instructor. They should only do tuning and repairs when approved by the instructor.

Students should only fly demonstration or competition flying at the stages they are rated for and always under the direct supervision of an instructor.

Pilots are expected to be familiar with and to follow all applicable national aeronautical regulations and local flying site rules.

Pilots should not participate in demonstration, competition or other organised flying which requires higher standards than they are rated for.

Minimum age: To fly paraglider: the minimum recommended age is 16 years old, with the written permission of parent or guardian when below 18 years.

PARA PRO, DESCRIPTION OF STAGE ELEMENTS:

Knowledge

Students stage 1, 2 and 3 should be given the necessary lectures, briefings, oral discussions and written tests to ensure that the required knowledge needed to meet the objectives of the applicable stage, is acquired. The listed requirements are a guide to meet those objectives. They should not restrict anybody from giving additional instruction if found necessary. The methods of instruction may vary and are left to the discretion of the organiser/instructor.

Stage 3. Before a student is signed off to become a pilot, he should pass a written test on air law, applicable rules and regulations and code of good practice, to ensure that he has all the necessary knowledge to operate alone, safely and correctly at sites and in the air.

Pilots stage 4 and 5, may at their own discretion acquire the required knowledge, either through attendance of lectures, briefings or through oral discussions and group or personal study.

Before a student or a pilot is signed off at an applicable stage, the instructor or observer must be convinced that he meets the required standard of knowledge.

Practical skills

Students stage 1,2 & 3, should be given the necessary instruction in each of the practical skills. Before a skill is actually performed, the student should be given a theoretical briefing in the basic theory, the purpose, normal procedures, mistakes, faults and dangers and their corrections, as well as the acceptable safe criteria of performance.

Each skill should be practised until the instructor is convinced that it is mastered within correct and safe procedures and limitations for the applicable stage. The skills may be signed off progressively as the above criteria is met. A special flight test is hence not necessary.

Pilots stage 4 & 5, may at their own discretion, within acceptable safe methods, acquire the necessary instruction for each practical skill. Before the skills are signed off, they should be demonstrated to an

instructor or observer, who should be convinced that they are mastered within safe procedures and limitations.

Experience

Experience is not, by itself, a measurement of pilot ability. It shall, however, ensure that the knowledge, skills and airmanship have been practised a minimum number of times in various situations. Exercise, drill and practice are important in the learning process to meet the objective of all true learning which is: to effect behavioural changes.

The experience requirements should be documented by a logbook or reliable witnesses. The instructor or observer should be convinced that the minimum requirements are met or he/she must require further proof.

Airmanship

The instructor or observer should be convinced that the student or pilot has the ability to take care of his own and others' safety at the applicable stage, within applicable rules, regulations, recommended safety limitations and code of good practice.

PARA PRO, STAGE 2, LOW FLIGHTS & ALTITUDE GLIDING (ORANGE)

Low flights is gliding near the ground over smooth terrain, normally not above 5 meters.
Altitude gliding is gliding with enough height and distance from the terrain to be able to manoeuvre relatively freely.

INSTRUCTIONAL AND SAFETY RECOMMENDATIONS:

The objectives of this stage are to introduce the student to paragliding by a progression through first low flights (the first stage) and then altitude gliding (the second stage) and make him able to practice and enjoy this within safe limitations, as well as to prepare him for the next stage.

This stage is probably the most important in the whole progression of the student, since it is here the basis for good (or bad) habits is founded. One shall in safe closeness to the ground, fly easy equipment, in easy hills and conditions, to gain confidence in flying, the equipment and also oneself and practice and learn the basic skills.

The student shall then gradually become accustomed to flying well clear off the ground, and lose possible height anxiety (allow for individual progression). One must now plan and prepare for each flight and one finds that one is actually safer with altitude that gives time and space to manoeuvre and correct for possible mistakes.

One learns and practices the basic manoeuvres, such as speed control including slow flying, co-ordinated turns, and combinations of those, correction for wind drift and precision approaches and landings. The latter proves that one has mastered the other manoeuvres with sufficient planning and precision. The key word is planning that starts even before takeoff and continues all the time. One must be ahead of the

events, observe, evaluate, decide and act accordingly. This "process of flying" is vital in all aviation, also on the higher stages.

It is warned against attempts to take off in cross-, down-, gusty or strong winds and to fly in unstable or turbulent conditions or in lift.

One should at the beginner's hill only practice gentle turns with only small diversions form the flight path.

In the intermediate hill, poor planning, preparations and takeoff techniques may have the most serious consequences. All manoeuvres should be done into the wind to avoid drifting into the hill or too far off and hence not be able to reach the landing area. Advanced manoeuvres, like 360o turns, pylon flying and slow flying should be

performed with extra caution and sufficient height and distance to the terrain to allow for corrections or recovery if control is lost. Turns, downwind flying and airspeed below speed for best glide angle close to the ground should be avoided. Approach should be planned in good time, and started with good height.

After all rating requirements have been met: The student should, when flying without the direct supervision of an instructor only fly in beginner or intermediate hills with light to medium (0-3 m/s, 0-15 km/h, 0-10 mph), smooth winds. Takeoffs should only be done in approximately headwind. Lift or turbulence should be avoided, or if this is not possible, flown straight through (away from the hill) to calmer conditions in order to land in the ordinary landing area. One should also avoid flying alone.

A beginner hill is a hill with smooth terrain, preferable snow, sand, grass or gravel, with a profile that allow for low flights with the type of glider in use. The takeoff and landing areas and the area between should be free of obstacles and other hazards with a good margin to either side. It should be possible to do the whole flight in close to a straight line.

An intermediate is a hill where takeoff, landing area and the flight path between them is considered to be easy and with good margins to any obstacle or other safety hazards. The takeoff area should be smooth with a profile that allows for acceleration to flying speed before getting airborne (no cliff launch). The landing area should be large and easy to reach by normal manoeuvring with a good margin of height. There should be established two-way communication between takeoff and landing if the landing area cannot be seen from takeoff.

Before progressing to the next stage it is of vital importance that the student knows the theory as well as mastering all practical skills, especially airspeed control in the lower speed range and that he is able to recognise and correct for nearness to stalls. This applies to both straight flight and turns.

To gain a minimum of experience, the student is recommended to practice a minimum of 4 flying days and 20 flights, after all rating requirements are met.

PARA PRO Stage 2, KNOWLEDGE Requirements:

<u>Aerodynamics</u>:

1. Lift: Difference in pressure created by: profile, airspeed and angle of attack. Low pressure over the wing, high pressure under the wing. Definition of: relative wind, even (laminar) airflow.
2. Lift factors: airfoils (wing profile), area, aspect ratio, air density, airspeed, angle of attack. Internal pressure in the wing, how influenced by use of brakes.
3. Resistance/Drag: Parasitic, induced, relation to airspeed and angle of attack. More drag when paraglider is behind the pilot on the ground than when overhead.
4. The nature of flying: One is always dependent on continuous forward airspeed in order to keep flying, one can not stop or reverse.
5. Load: Weight, G-force. Forces in turns, lift gradients gusts and turbulence. Opening shocks.
6. Driving forces:
    a, On the ground: By running.
    b, In the air: The principle of the inclined plane: In flying without engine one is always going down (related to the air around you) because gravity is the driving force.
7. Airspeed versus Groundspeed. Wind effects: Why to take off and land into the wind. Head- or tail-wind, wind drift and crabbing, drift and corrections in turns.
8. Stalls: Description, dangers, recognition, avoidance and recovery. In turns, accelerated, secondary, in wind and lift gradients, downwind, in gusts and turbulence.
9. Frontal collapses: Both asymmetrical (one wingtip) and symmetrical (both wingtips, or entire leading edge). Description, dangers, recognition, avoidance and recovery. In turns, gusts and turbulence.
10. Spins, Spirals, Skids and Slips. Negative spins. Description, recognition, avoidance and recovery.

11. Wing tip vortices: Turbulence behind all aircraft, how to avoid collapses therefrom. Ground effect.
12. Control movements and principles: Airspeed control and turning. Use of brakes versus weight-shift.
13. Airspeeds and speed polars: Minimum sink and best glide angle, relation between airspeeds in head- and tail-wind and varied wing loading.
14.

<u>Micro-meteorology (site conditions) and meteorology:</u>

1. Wind, description and creation: Airflow from high to low pressure. Created by uneven heating of the surface. (Samples: Water flow. The sea breeze).
2. Wind measurement, wind meters, natural indicators and signs.
    a. Velocity: Knots, MPH or m/s.
    b. Directions: Compass and quadrant (Head or up, tail or down, crosswind).
3. The wind force: Increases proportionally with the square of the wind velocity increase. Effects, dangers.
4. Wind gradient: Effect, dangers, corrections.
5. Uneven wind/gusts, turbulence and lift: Causes, signs, dangers.
    a. Mechanical turbulence: Behind or lee of obstructions, trees, buildings, hills.
    b. Thermal turbulence: Instability, uneven heating, dangers, recognition.
    c. Wind shifts: Gusts and dangers.
    d. Wind shears: Descriptions, dangers.
6. Local conditions: Terrain effects, valleys, around obstructions and corners.
7. Weather: Creation, heat and pressure differences, stability/ instability, circulation, wind systems.
8. Sea breeze: Creation, effects.
9. Waves: Rotors. Behind mountains, signs and dangers.

10. Ridge effects: Descriptions, kinds, gradients, dangers.
11. Thermals: Description, instability, turbulence, signs.
12. Clouds: Cumulus, cumulonimbus, rotor clouds, dangers.
13. Air masses and Fronts: Cold fronts, warm fronts, signs and conditions.
14. Weather reports and evaluation:
    a. Weather reports: Signs, interpretation.
    b. Reading wind: direction and force, at takeoff and landing, along the flight path, indicators.
    c. Recognition of safe and dangerous conditions.

Paragliders and equipment:

1. Construction and Terminology: Materials and parts.
2. Airworthiness standards and requirements: Design and certification, purpose and need. Design maximum loads, manoeuvring limitations, stability, stall characteristics, manoeuvrability, speed range, pilot weight and rating.
3. Handling: Control response. Roll, pitch and yaw coupling. Stability, slow flight and stalls, B-lining, takeoff and landing characteristics. Effect of accelerators or speed systems.
4. Maintenance: Daily and periodical inspection and care, qualified tuning and repairs.
5. Selection of gliders: Rating and experience, type of flying, performance, handling and weight range. Use and ambitions. Appropriate model rating for students: Standard rating (not Performance or Competition rating).
6. Selection of harnesses: Types of harnesses, weight-shift or classic; use of cross- bracing. Rating and experience.
7. Performance: Minimum sink, maximum glide, maximum speed, penetration, turning capacity.
8. Safety equipment: Helmet, boots, gloves, clothing. Rescue system. Dorsal protection and hip protection. Airbags.

Airmen

1. Physical factors: Fitness, strength, exhaustion. Drugs and alcohol. Vertigo, hyperventilation.
2. Psychological factors: Anxiety and fear of height. Recognition of own ability and limitations versus natural and equipment limitations. Confidence versus overconfidence (The Icarus syndrome). Group and personal pressures and approval, saying no, the walk down. Self discipline.
3. The learning process and environment: The training system, objectives, description, safety, motivation, individual progress.
4. Conduct/ Airmanship:

    a. The nature of flying: One is always dependent on continuous forward airspeed in order to keep flying, one can not stop or reverse.
    b. The process of flying: Insight, continuous evaluations, decisions, actions. With regard to the nature of flying, being ahead.
    c. The commando principle: The necessity of completing every started flight. The danger of panic.

Rules and regulations (as applicable):

1. Government or other official authorities.

    a. Airspace and Air traffic: Controlled and uncontrolled airspace and airports, VFR/IFR traffic and rules, right of way rules.
    b. Other rules.
2. National Paragliding Association.
3. School and training.
4. Local and site(s).
5. Code of good practice.
6. 6. Right of way rules.

Practical flying and safety:

1. Instructional and safety recommendations.
2. Flight planning: The process of flying: Information/observation, evaluation, decisions and execution. Making a flight plan.
3. Preparations: Standard routines and checks, double checks of critical factors.
4. Flying exercises: The practical skill requirements: Description, intention, procedures, execution, errors and dangers.
5. Critical, dangerous and emergency situations: Their causes, avoidance, recognition, corrections. Applicable training methods (simulations).
    a. Poor preparation: Equipment failures and malfunctions.
    b. Ground handling in gusts and strong winds: Loss of control. Being dragged, avoidance, prevention.
    c. Stalls: Level flight, in turns, low, high, in takeoff, in gradient, in gusts, in turbulence, in (unexpected) lift, downwind, downwind turns in gradient.
    d. Poor takeoff techniques: Poor control of glider, poor airspeed and directional control. Over-control, turn back to hill. Getting into harness, release of brakes to accomplish same.
    e. Wind conditions: Wind strength, crosswind, gusts and turbulence, unexpected lift, drift into hill, wind gradient.
    f. Crashing/ Emergency landings: Avoidance, preparations.
    g. Takeoffs above 1500m: Air density decreases. True airspeed increases.
    h. Critical manoeuvres: Flying close to terrain and obstructions, stalls and slow flight, 360o turns, spins, spiral dives, pylon flying. Takeoff in wind without assistance, particularly near cliffs
    i. Unfamiliarity: With sites, conditions, glider or harness, manoeuvre or tasks.
    j. Physical and Physiological factors: Stress, pressure, exhaustion, fear, drugs and alcohol.
    k. Poor airmanship: Overestimating own ability and/or underestimating sites, conditions, equipment or task.
    l. Vertigo: Flying with reduced visibility.
    m. Combinations: Of two or more of the above multiplies the risk of accidents.
    n. Emergency manoeuvre: Use of parachutes, prevention of down-planing of paraglider after parachute deployment. Landings in water, trees, rough terrain, obstructed areas, electrical wires.
    o. Accidents: Assistance and reports.

PARA PRO Stage 2, PRACTICAL SKILLS Requirements:

Part 1: Introduction and LOW FLIGHTS:

1. Transport, care and maintenance: of paraglider and equipment. Accordion vs. rolled fold up. Proper stowing of lines and risers.
2. Pre and post flight routines:, Laying out, making a horseshoe, “building a wall”, adjustments, pre-flight checks, line and karabiner control, harness control, attachment of cross-bracing and speed system. Packing up.
3. Takeoff position and final check: Position of risers and toggles. Body and arm position. Final check: Karabiners and cross-bracing, conditions, clear area.
4. Takeoff exercises. The glider to flying position: Determined, correct running to get the glider up. Checking the glider visually. Letting go of front risers. Correcting problems. Continue running, smooth acceleration, no jumping into harness.
5. Running with glider: Controlling position of paraglider and angle of attack and roll, on flat ground and on a slope.
6. Stalling and stopping a run: On flat ground and on a slope. Correct landing technique. Not flaring too soon.
7. Flight planning: Evaluating site and conditions. Decisions, giving a flight plan.
8. Takeoff: Takeoff position. Smooth acceleration and lift off, with correct airspeed and good directional control.
9. Speed control: Best glide angle speed, no tendency of slow flight or stall.
10. Directional control: Maintaining heading, smooth course corrections, avoidance of oscillations.
11. Shallow turns: Co-ordinated entry and recovery, small diversions from course.
12. Landings: Directly into wind.

Part 2: ALTITUDE GLIDING:

1. Planning: Insight, evaluation of site and conditions, decisions, giving a flight plan.
2. Pre-flight routines: Repetition of Part 1, spreading, adjustment, pre-flight checks.
3. Takeoffs: Start position, final check, smooth acceleration, lift off at correct speed, good speed and directional control.
4. Speed control manoeuvres: Best glide angle and minimum sink speed.
5. Turns: 90o - 180o, gentle to medium bank, left and right, co-ordinated.
6. Slow flight: Recognition and recovery (at safe altitudes).
7. Ground reference manoeuvres:Figure 8-turns and rectangular patterns, correcting for wind-drift.
8. Traffic rules: Manoeuvring according to other traffic.
9. Landing patterns: Following planned procedure. Approach with downwind, base and final legs. Figure 8-turns. Control of gradient.
10. Turning and landing only by the use of the rear risers: Simulation of brake-line failure.
11. Precision approaches and landings: Safe and standing inside an area pre-set by the instructor. Slow flight and mushing is not allowed.

PARA PRO Stage 2, EXPERIENCE Requirements:

1. A minimum of 6 flying days.
2. A minimum of 30 successful flights, of which at least 10 are altitude gliding flights.

PARA PRO Stage 2, AIRMANSHIP Requirements:

The instructor should be convinced that the student is able to take care of his own and others' safety while flying low or altitude gliding within the instructional and safety recommendations given.

PARA PRO, STAGE 3, BASIC SOARING, GREEN.

Basic soaring is soaring in easy ridge or thermal conditions, without gusts or turbulence, well clear of the terrain, obstacles and other traffic.

INSTRUCTIONAL AND SAFETY RECOMMENDATIONS

The objectives of this stage are to introduce the student to soaring flight and to make him able to practice and enjoy soaring within safe limitations. He should also be qualified to become a pilot, with the ability to operate alone within safe limitations and to take the responsibility for his further progression.

Soaring has many stages in itself, with increasing difficulty, from easy conditions and manoeuvs with a large safety margin, to marginal or extreme conditions with minimal margins. When a pilot "masters the art", it seems quite simple and in a sense it is. This, however, should not mislead anyone into believing that it is easily mastered. Lack of knowledge, misjudgement, wrong manoeuvring, ignorance or gambling may easily end up in a serious accident.

One will in this stage get more time to practice in the air and the flying can get automated. There is however less room for mistakes and errors. Therefore careful planned progression is very important. Exercises should in the beginning be simple and with large margins. Soaring requires careful preparation, good planning and ability to do precise and fast manoeuvring. Especially important is good launch technique and control in the lower part of the speed range. One must be able to fly co-ordinated turns with a minimum loss of altitude, often in marginal conditions close to the ridge while calculating drift and keeping constant lookout for other traffic and manoeuvring according to traffic rules. One must also be able to recognise all kinds of collapses and to execute prompt and correct recovery at the first signs, with a minimum loss of height and control.

To become a pilot: One should now also be free to develop further, and one has still a lot to learn in order to be able to use the possibilities there is. One will be given possibilities that will demand very good "airmanship" including self discipline and carefulness. It can often be necessary not to fly or to fly with large margins. The point is that one must show that one is able to take responsibility and that one know where ones own as well as others limits are, and when further instruction is necessary.

An instructor will no longer be responsible. This puts large demands on one’s personality.

It is warned against too fast a progression, overconfidence, inattention, ignorance, gambling, misjudgement and lack of skills. One will operate in stronger winds with smaller margins than on

previous stages. Even before takeoff accidents can happen. Poor takeoff techniques, lack of control and correction of glider while running, or takeoff without a "perfect" glider can have serious consequences. One

should have qualified assistance when launching in strong or gusty winds. Further one should be very careful with the conditions, which can change suddenly. Strong wind and turbulence may easily lead one to the lee side, or to drift in over dangerous/ unknown terrain. One should also avoid flying alone.

It is also warned against the so called "intermediate syndrome" or "Icarus syndrome", meaning that it is easy to believe that one now knows and masters everything, and that neither oneself or the equipment has limitations. (It is well known that Icarus was the first who killed himself because of this attitude.)

The student (before stage 3 is attained) should only fly:, with instructor present, in easy smooth conditions with a wide lift band or in smooth thermal conditions. This will allow him to manoeuvre with a good margin to other traffic and the terrain. He should be careful not to turn before he is established in flying position with good control of airspeed and direction. He should not try to return to a lift band he has flown out of. Ridge soaring in marginal lift, in strong wind (above 7 m/s, 25 km/h, 15 mph), in turbulence, cliff launches, crosswind launches, top landings or landings into the hill (hillside landings) are also not allowed.

After all rating requirements have been met one can fly freely within the safety limitations, as long as a higher stage is not required by other rules or regulation. One will have the responsibility to seek further instructions when necessary. It is recommended in the beginning to use the rules for students (above) as a guidance for safe flying.

Only experienced pilots should fly at advanced sites close to the ridge, in marginal, strong or turbulent conditions or in "heavy traffic".

Before progressing to higher stages, the pilot should have a variety of experience from different sites and conditions. The process of flying should be automated, so that reactions are fast and correct in the different situations/exercises one has to master. It is recommended to fly a minimum of 20 hours and 50 flights.

PARA PRO Stage 3, KNOWLEDGE Requirements:

Aerodynamics:

1. Repetition of stage 2 theory.
2. Stalls and collapses: In takeoff, in gusts and turbulence. In lift gradients. Turning in lift gradients. In wind gradient. Turning in wind gradient (downwind). Secondary stalls.
3. Speed polars: Performance. Evaluation of glide angle and minimum sink with corresponding airspeeds: In head- and tail- wind, in lift and sink. With regards to wing loading, air density, turns.
4. Wind effects: Wind-drift and crabbing, drift and corrections in turns. Head- or tail- wind, penetration.
5. Wing tip vortices: Behind other gliders, aeroplanes, helicopters.

Meteorology:

1. Repetition of stage 2 theory.
2. The wind force: Increases proportionally with the square of the wind velocity increase. Effects and dangers. On the ground, at take off, in the air, at the landing.
3. Ridge lift:
    a. Factors: Shape and gradient of slope, wind direction and velocity.
    b. Components: Horizontal and vertical, gradients, acceleration, strongest lift, strongest headwind.
    c. Dangerous conditions and areas: Lee-side, turbulence, rotors, strong gradients and winds. Winds that increase quickly in speed.
    d. Safe and good conditions: Up and in front of the ridge.
4. Waves:
    a. a. Factors: Terrain, wind direction and velocity.
    b. Signs: High winds, lenticular clouds, rotor clouds.
    c. Dangers: Rotors, penetration, strong lift, high altitudes, hypoxia, cold.
5. Thermals:
    a. Factors: Instability, lapse rates, terrain, sunshine and heating.
    b. Signs: Large temperature drop with altitude, wind shifts, lulls and gusts, cumulus clouds.
    c. Dangers:Gusts and turbulence, strong lift gradients, pitch ups and downs.
    d. Safe and good conditions: Large thermals, smooth and moderate gradient, light to medium winds.
6. Frontal lift: Cold front description.
    a. Factors: Air masses, from high to low pressures, instability.
    b. Signs: Cumulus clouds, moving clouds, squall lines, wind-shift, temperature rise/fall.
    c. Dangers: High winds, wind shifts and gusts, strong lift, turbulence.
7. Clouds: Cumulus, cumulonimbus, cap clouds, rotor clouds, stratus clouds, lenticular clouds.
8. Weather signs: Reading the weather on the ground and in the air:
    a. Measuring: Of the wind, pressure and stability. b. Clouds: Associated weather and conditions.
    b. Wind:Reading the wind, wind indicators.

Paragliders and equipment:

1. Repetition of stage 2 theory.
2. Design Factors: Airworthiness, performance, handling.

3. Maintenance: Daily and periodical inspections and care, repairs.
4. Tuning: For maximum performance in the prevailing conditions.
5. Instruments: Variometers, altimeters, airspeed indicators.
6. Clothes and equipment: For endurance, high altitude and cold.
7. Selection of glider: Appropriate model rating for pilots at this level: Standard rating (not Performance or Competition rating).

Airmen:

1. Repetition of stage 2 theory.
2. Pilot in command: Airmanship, traits, abilities, responsibilities, command and control. Mastering the nature and process of flying.
3. Physical factors: Vertigo, hypoxia, cold, exhaustion.

Rules and regulations:

1. Repetition of stage 2 theory.
2. The airspace and other traffic in the air:
    a. Controlled airspace and airports: Control zones, terminal areas, airways, ATC, VFR/IFR traffic patterns, rules of operation, VFR rules for minimum visibility and distances from clouds.
    b. Uncontrolled airspace and airports: Information zones and services, VFR/IFR traffic patterns, rules of operation, VFR rules for minimum visibility and distances from clouds.
    c. Other airspace: Restricted, dangerous and prohibited areas.
3. Information sources: ICAO maps, publications, manuals, NOTAMs. Where to obtain. Air Traffic Control, information service, local airports and clubs, schools.
4. Right of way rules for paragliders and hang gliders: General, ridge soaring, thermal soaring.
5. Other rules and regulations, as applicable: Government, National Paragliding Association.
6. Code of good practice.

Practical flying and safety:

1. Repetition of stage 2 theory.
2. Instructional and safety recommendations.
3. Preparations: Standard routines and checks, double checks of critical factors.
4. Flying exercises: The Practical skill requirements: Description, intention, procedures, execution, errors and dangers.
5. Critical, dangerous and emergency situations: Their causes, avoidance, recognition, corrections. Applicable training methods (simulations).
    a. Ground handling in gusts and high winds. Practice of reverse inflation, use of crossed-hands control or not. The turn from reverse to forward position, when and how. Deflation of glider when necessary, avoidance of being dragged.
    b. Poor takeoff techniques: Wrong use of or wrong commands to assistants. Poor control off the glider. Poor airspeed and directional control, collapses, loss of control, turning back to ridge. Getting into harness.
    c. Stalls: In gusts, turbulence, in lift gradient, close to the terrain, in turn.
    d. Conditions: Marginal lift, strong winds, gusts, turbulence, rotors.
    e. Unusual attitudes: Turbulence, aerobatics, flying close to clouds.

f. Critical manoeuvres: 3600 turns, returning to lift band, flying close to the terrain, top landings, hillside landings, stalling in turns. Stopping a negative spin. Recovery from major collapses (symmetrical or asymmetrical). The use of “big ears”. Stopping a spiral dive.
g. Unfamiliarity: With sites, conditions, glider or harness, manoeuvres or tasks.
h. Physical and Physiological factors: Stress, pressure, exhaustion, fear, drugs and alcohol.
i. Poor airmanship: Overestimating own ability, and/or underestimating sites and conditions.
j. Vertigo: Flying with reduced visibility.
k. Combinations:Of two or more of the above multiplies the risk of accidents.
l. Emergency manoeuvres: Use of parachutes. Landings in water, trees, rough terrain, obstructed areas, electrical wires.
m. Accidents: Assistance and reports.

PARA PRO Stage 3, PRACTICAL SKILLS Requirements:

1. Review: Stage 2 manoeuvres mastered.
2. Planning: The process of flying, giving a flight plan.
3. Preparations: Spreading out, attachment of harness, adjustments, pre-flight checks.
4. Ground handling: Control, assistance, correct procedures.
5. Takeoffs in wind: With assistance, procedures, instructions, Start position. Final checks. Speed and direction. Flying position.
6. Minimum sink manoeuvres: Speed control, co-ordinated turns left and right, minimum loss of height, without any sign of stall.
7. Wind corrections exercises/ Manoeuvring in lift bands: Figure 8 manoeuvring, corrections for wind drift, turns and reversing direction. Manoeuvring according to terrain and other traffic, keeping a good lookout.
8. 360 degree turns: Ordinary speed and on minimum sink, right and left, shallow to medium bank, without any sign of stalls. (Safe height and distance to terrain.)
9. Asymmetrical collapses: 20-30% on one side and on both sides. (Safe altitude and distance.) Progression from pulling on 1 A-line to 2, 3, 4. Use of counter- steering with weight shift. Pumping out folds.
10. Big ears: Pulling down of both sides of outer A- lines to equal length and “folding in” of outer wingtips, maintain straight andlevel flight, using weight shift only. Weight shift left and right sides, return to straight and level flight. Use moderate accelerator to increase sink rates. Note: This manoeuvre should only be performed at min. 200 m above ground with sufficient clearance from obstacles and completed at min.100m. above ground.
11. Soaring: Entering, turning and manoeuvring in lift, corrections and gradient, without any signs of stalls.
12. Precision approaches and landings: Safe and inside an area decided by the instructor.

PARA PRO Stage 3, EXPERIENCE Requirements:

1. A minimum of 60 successful flights and a total of 10 flying hours.
2. Flights from 5 different sites, of which 3 are inland.
3. Minimum 3 flights and a total of 2 hours of flying in lift.

PARA PRO Stage 3, AIRMANSHIP Requirements:

The instructor should be convinced that the student is able to take care of his own and others' safety within applicable rules and regulations, recommendations and code of good practice, while operating alone.

Pilots up to Para Pro stage 3 have the ability to fly without the supervision of an instructor. This does not mean the pilot is at the top level. Paragliding progression is never ending. Increasing you ability to fly new horizons requires higher levels of training.

Para Pro Stages 4 and 5 are not mandatory to fly solo, but are highly recommended if the pilot wishes to continue to progress their skills in a safe manor.

PARA PRO, STAGE 4, ADVANCED SOARING, BLUE.

Advanced soaring is flying in demanding lift, as marginal, strong and/or turbulent hang, thermal or wave conditions.

INSTRUCTIONAL AND SAFETY RECOMMENDATIONS:

The objective of this stage is to make sure the pilot safely can fly advanced soaring, also under pressure as in displays, demonstrations and competitions.

This stage has turbulence and small margins as key words. One must be prepared to be forced to operate close to the safe operating limitations for the both the equipment and oneself. Even while one certainly should give both equipment and oneself good safety margins, one must be prepared for the possibility that those margins may be passed. A thorough knowledge of emergency procedures, such as recovery from asymmetric and symmetric collapses, stalls, spins, spirals, and surges, as well as use of parachute, is very important. One must have a thorough knowledge of performance curves and correct flying speeds (speed polars), use of accelerator (speed system), design limitations and load factors.

Advanced soaring requires the ability of fast and accurate evaluations of conditions and situations combined with fast and precise manoeuvring. There will be situations with little time for balanced decisions and wrong reactions. One must be prepared by careful planning as well as one always must be ahead of the situation, so that in critical situations one gives the right reaction without wasting time. One must have highly developed skills and a thorough knowledge in order to gain maximum performance. One must, often close to the terrain and in turbulent conditions, master all types of turns combined with low speeds, and also keep a close watch of terrain and other traffic.

It is warned against extreme conditions, because of the enormous forces that may be present. Regardless of pilot skill and experience one may easily lose control. Structural (equipment) failures can also happen. One must never overestimate oneself or the equipment. If one meets strong turbulence, one must not panic and try to avoid it by sharp turns or high speeds, since this increases the possibilities for loss of control (or major collapses). Correct manoeuvring in strong turbulence is moderate speeds and flight straight ahead or shallow banks if necessary.

Other dangers are stalling or frontal collapse, and loss of control close to the terrain. If this happens, the correct reactions are vital. That is, in case of a stall first reduce the angle of attack by raising one's arms, control the ensuing surge of the canopy, then wait for speed to manoeuvre and then avoid collision. In case of a frontal collapse, this is to increase angle of attack and if necessary counter any tendency to turns and then avoid collision. One should also avoid flying alone.

Students are under no circumstance allowed to fly advanced soaring.

Pilots must have a licence for this stage in order to fly advanced soaring in displays, demonstrations or competitions or else where this stage is required.

Before progressing to the next stage one must be able to, with a great deal of accuracy, evaluate conditions to be acceptable in relation to safety. One should also show that one is able to find and use all kinds of lift.

PARA PRO Stage 4, KNOWLEDGE Requirements:

Repetition from stage 3, especially:

<u>Aerodynamics</u>:

1. G-loads:
    a. Versus manoeuvring and speed in turbulence, turns and pulling out of spiral dives.
    b. Correct manoeuvring speeds in turbulence. Stability. Speed polars.

<u>Meteorology</u>:

1. Thermals:
    a. When, how and where. Stability versus instability in the air. Lapse rate.
    b. Best thermal areas. Time of day and of year.
    c. Types of thermals, dangerous thermal conditions, dry thermals.
    d. Signs: Clouds, cumulus, cumulonimbus. Squall lines.
2. Wave conditions: waves, turbulence, high altitudes.
3. Dangerous conditions: Strong wind. Clouds, cumulonimbus, severe turbulence.

<u>Glider and equipment:</u>

1. Structural limitations: loads, speeds, attitudes, aerobatics. Structural failures.
2. Stability: profile, wing torsion, pendulum stability, recovery after stalls or major collapses.

3. Selection of glider: Appropriate model rating for advanced soaring pilots: Standard rating, or Performance rating (but not Competition rating).

PARA PRO Stage 4, PRACTICAL SKILL Requirements:

1. Stage 3 manoeuvres, mastered, reviewed if necessary.
2. Planning: The process of flying, giving a flight plan.
3. 360o turns, shallow to medium bank, left and right.
4. 360o turns steep, left and right.
5. 360o turns, at minimum sink: (flat), left and right.
6. B-Line Stall: From minimum sink speed and flight straight ahead. (Safe altitude and distance.) To be attempted only with instructor, with radio communications, with reserve parachute present, and over water with rescue-boat available. B- line stalls: force required to enter, avoidance of deep stall during recovery by quick let-up of risers.
7. Ridge soaring: Launching and soaring.
8. Thermal soaring: Launching, locating, entering and climbing.
9. Marginal lift: Launching and soaring.
10. Gusts and turbulence: Launching and soaring.
11. Manoeuvring according to the traffic rules.

PARA PRO Stage 4, EXPERIENCE Requirements:

1. Same as for stage 3, easy soaring, plus:
2. A total of minimum 20 flying hours.
3. A total of minimum 5 hours of thermal soaring.
4. A total of minimum 5 hours of ridge soaring.

PARA PRO Stage 4, AIRMANSHIP Requirements:

The pilot should be considered to be able to take care of his/her own and others' safety while flying at this stage, also during displays, demonstrations and competitions and elsewhere this stage in required.

PARA PRO, STAGE 5, CROSS COUNTRY (BROWN)

Cross Country flying is to use rising air currents (soaring) to fly away from (and maybe return to) the local flying site.

INSTRUCTIONAL AND SAFETY RECOMMENDATIONS:

The objective of this stage is to enable the pilot to fly cross country safely, also under pressure as in demonstrations, displays and competitions.

This stage has nearly unlimited possibilities, from short and easy flights, to really demanding long distance flights, where if the conditions permit, the pilot's ability, as well as his/her determination, will

set the limits. It is here that the pilot's ability, that is his knowledge, skill, experience and airmanship, is put to the ultimate test.

One must be able to plan, administer and perform each flight within safe limitations, while one must stress oneself and the equipment to the same limitations to be able to go really far. One must have a thorough knowledge of aerodynamics and meteorology as well as air traffic rules and the airspace. In accordance with the planned flight, and existing and possible conditions, one must choose correct equipment like clothes, aids and emergency equipment, as well as organising necessary transport and pick up, radio communications and procedures for use in an emergency situation such as landing and getting injured in deserted and difficult terrain.

Cross country flying requires the ability to find all types of lift, as well as correct manoeuvring in lift and sink areas. One must be able to judge the terrain and conditions so as not to land where it is prohibited, or where one may add injuries to oneself or others, or in areas that are remote. One must be able to very quickly pick out the best landing fields if one has to go down, and if necessary set up a precision approach to a small landing field with a short field landing over possible barriers. This is because any type of injuries may have the most serious consequences.

It is warned against cross country flying into remote and deserted areas, over areas with no possibilities for emergency landings and over water. One must always make sure that someone knows where one intends to fly, and that a search is activated if found necessary. If there is any possibility for a landing in remote and deserted areas one should bring an emergency pack according to the conditions. One should also avoid flying alone.

Students are under no circumstance allowed to fly cross country.

Pilots must have a licence for this stage in order to fly cross country in displays, demonstrations or competitions or else where this stage is required.

PARA PRO Stage 5, KNOWLEDGE Requirements.

Navigation:

1. Planning: Collecting information on weather, terrain, sites, airspace, air traffic and hazards. Use of map and other publications, air traffic and weather service.
2. Weather service: Where and how to get weather information.
3. Interpreting weather reports: Present (MET AR), warnings (T AF), area (IGA), maps.
4. Interpreting weather: Signs, recognition of acceptable and dangerous conditions.
5. Airspace and air traffic:

    - Controlled airspace: Air corridors, terminal areas, control zones and airports.
    - Uncontrolled airspace: AFIs and other airfields. Danger, restricted, prohibited and alert areas.
    - Military traffic: Training areas, photographing from the air.
    - Governmental publications: AIC, AIP, NOTAM, ICAO maps.

6. Use of maps:

7. a. Planning of flights: Dangerous/ deserted areas, alternative routs, landing areas, communication and retrieval.
8. Equipment: For altitude and low temperatures, emergency and first aid equipment, survival equipment, warning and communication equipment.
9. Selection of glider model: Appropriate model rating for cross-country pilots: Standard rating or Performance rating. For advanced cross-country pilots willing to possibly compromise handling or safety standards for additional performance: Competition rating.
10. Standard procedures: Signals, retrieval.
11. Emergency procedures: Warning, search after missing pilots.

PARA PRO Stage 5, PRACTICAL SKILLS Requirements:

1. Review: Manoeuvres from previous stages mastered.
2. Planning: Evaluations and decisions, giving a flight plan.
3. Soaring: Search for and use of all kinds of lift. Flying in lift and sink, head- and tail-wind with correct speed.
4. Cliff-launch in light to moderate wind. To be avoided due to risk of collapses.
5. Cliff-launch in strong wind: Not to be attempted in a paraglider, only in a hang glider, and then only with assistance.
6. Crosswind-launch: Wind maximum 45 degrees on launch direction. Crosswind- component less than 2 m/s, 7 km/h, 5 mph.
7. Out landings: Precision approach to unknown landing area: Selection of landing field, control of speed and glide angle.

PARA PRO Stage 5, EXPERIENCE Requirements:

1. Same as for stage 4, plus.
2. A total of 50 flying hours.
3. A total of 5 cross country flights in various lift, minimum 20 km each (ridge soaring and flying along the same ridge, only, is not approved).

PARA PRO Stage 5, AIRMANSHIP Requirements:

The pilot should be able to take care of his own and others' safety during cross country flying, also during displays, demonstrations and competitions and elsewhere this stage in required.

Exams

Example Questions and Answers that we will be using in our syllabus. Exams are put into two groups Elementary and Club Pilot. A student must pass both parts of the written exam to pass for their license.

Section A. Elementary, (Para Pro levels 1, 2)

Q1: What is the rule for static kiting?
A1: Static kiting is a banned practice (People used to tie themselves to a fixed object).

Q2: Describe a stalled wing.
A2: A stalled wing is when the airflow is no longer on the top surface of the wing.

Q3: Low pressure- which way does it rotate?
A3: Low pressure anti clockwise.

Q4: High pressure- which way does it rotate?
A4: High pressure rotates clockwise.

Q5: How does a wing produce lift?
A5: A wing produces lift by moving forward through the air. 2/3rds lift on the top and 1/3rd below. Low pressure is on the top, high is on the under surface of the wing.

Q6: While flying top to bottom your glider suffers a collapse on the left hand side- what should be the first reaction? Your height at this time is 200ft
A6: Wing collapsed on the left- first keep your course/direction now put your weight onto the flying side of the wing and pump out the wing by long hard pumps on the brake.

Q7: You are flying with the ridge on the right a pilot is flying towards you what action should you take? What other problems should you look out for?
A7: You should keep your course as the pilot with the ridge on the right has right of way. Watch out for any wake turbulence from the pilot passing.

Q8: What is air speed and ground speed?
A8: Ground speed is the pilot moving over the ground, airspeed is the air moving over the wing.

Q9: You are flying into a head wind of 10mph.Your glider has a top speed of 15mph. What is your ground speed?
A9: Ground speed is 5mph.

Q10: You are flying into wind at 1,000ft AGL and you see a landing below. Wind speed is 20mph your and glider has a max speed of 20mph. What would you expect the wind speed to be in the landing? (In the Uk)

A10: Speed in the landing will be a lot less, and you could over shoot the landing. Look out for a wind sock it could be limp.

Q11: Making a turn- what should you do first?
A11: Turning? Look first!

Q12: It is 18mph to 20mph on take off. Would you consider this to be gusty? (In the winter)
A12: No, this is not gusty but is on the limit. 50ft above this height the wind could be 25mph.

Q13: Angle of attack- what is it?

A13: Angle of attack, is your wings angle relative to the wind.(Hands up low angle of attack).

*Q*14: Leading edge- what part of the glider is this? *A14: Leading edge is the front of the wing.*

Q15: Arriving on the flying site, what should be the first thing that you should do?
A15: Monitor the weather conditions for as long as it takes, if not sure do not fly.

Section B: Club Pilot, (Para Pro Level 3)
Q1: At 2,000ft above the ridge, you see a sailplane on a head on path to yourself. Who has right of way?
A*1: No one has right of way as you are both gliders, both break right.*

Q2: You are at 200ft above the ridge heading out to a thermal source .A glider to your right is also heading to this thermal source. Who has right of way?
A2: The pilot on the right has right of way.

Q3: You are on take off ready for launch and see a pilot coming into land. It is a busy day- should you take off as there would be enough time to launch?
A*3: The landing pilot has right of way due to the fact you give way to pilots landing. Always allow plenty of time, if it is too busy then pack up and go home*

Q4: Glider enters a flat spin (this could be because you have applied too much brake on one side and let up on the other side) What will happen to the glider and what should you do?
A4: The glider will spin, despite the spin height loss will be slow. Hands up should be applied... watch out for the glider diving in front of you. If it dives this will involve rapid height loss. Watch out for the ridge as you may well be flying towards this, the glider lines may also have become twisted.

Q5: Night flying- what are the rules?
A*5: Night flying is not allowed/ half hour before sunrise half hour after, watch out for shadows / low sun in face.*

Q7: Big ears- what is it and what effects does this have on your flight?
A*7: Big ears is applied when you wish to lose height not- a rapid descent method- drag is increased forward speed will be down.*

Q7: Speed bar and trim tabs- explain the purpose of these pieces of equipment.

A7: Speed bar and trim tabs allow the pilot to alter the angle of attack- used to move faster through the air. Glide angle will go down sink rate will go up. And usually with the speed bar your glider becomes unstable in strong lift.

Q8: Profile drag ? Explain.
A8: Profile drag is the friction of the air over the wing.

Q9: Induced drag ? Explain.
A9: Induced drag is the air flowing off the wing; like a car petrol for fuel- exhaust for the waste. Nothing for free.

Q10: Parasitic drag ?Explain.
A10: Parasitic drag is the lines, pilot (form drag) and all that does not produce lift- the faster you fly the more you produce.

Q11: Cirrus cloud- what height ?
A*11: Cirrus cloud can be found at an height of 20,000ft.*

Q12: Red and green lights fired every 10 seconds- what does this mean?
A12: Red and green light fired into the air- you are in restrictive area, divert from course and leave the area.

Q13: NOTAM's-, what are they?
A*13: NOTAM's are notifications to all pilots normally found posted in an airports.*

Q14: Centre of pressure -describe.
A14: Is above the pilot while in flight, and is just behind the leading edge of the wing. Is the sum total of all the forces acting together.

Q15: Altimeters work on what ?
A15: Altimeters work on pressure.

Q16: Warm front- what are the cloud formations?
A16: Warm front clouds start with cirrus 30,000ft cirrus stratus 20,000ft, alto stratus 10,000ft nimbus stratus right on top the hill.

Q17: Cold front- name the clouds?
A17: Cold front clouds start with cumulus, cumulonimbus.

Q18: Air temperature 27c. Dew point 12c. Cloud base is what?
A18: Cloud base 6,000ft, 27 - 12 x 400=cloud base 6,000ft.

Q19: Katabatic / Anabatic. Explain.
A19: Katabatic= heavy cold air falling, this could be found at the end of the day in summer in a valley. The side that is in shadow is now cool dense/heavy and falls down and pushes the air up on the other side giving a smooth flight. Watch out when taking of late at night in the Alps your flight might have to change. Anabatic= air flow up a slope.

Towing

General Guide

Towing is a very effective way to launch a paraglider inland as well as at the coast. Many hours of excellent flying are possible with towing if it is done with proper care, the necessary knowledge and under the correct circumstances. Towing is the answer for flatland flying and gives you as a pilot a chance to fly where no mountains, hills or dunes exist.

Please note that towing can be very dangerous if it is done without the necessary knowledge, right equipment and qualified skills. With this “Towing Guide” we will try to convey to you the basics of towing as well as the dangers that is hidden in the event.

Towing Rules for Paragliders:

1. Towing is only allowed by using an adjustable towing device or winch.

2. NO STATIC LINE TOWING WILL BE ALLOWED.

3. The local CLUB Training must approve the Tow-system.

4. System must be operated by a crew who have received instruction from a licensed pilot with at least a Club Pilot Licence (Para Pro 3).

5. Inexperienced pilots to be given thorough briefing and demonstration by suitably experienced pilot and crew. First time tows to be carried out in early morning or late afternoon conditions with constant wind direction and speed.

6. The “Release” that attaches to the pilot’s harness must be reliable and tested to be reachable by both hands for release.

7. Weak link to be used on pilots end of line. Weak link to give in at 1 to 1.5 times of the combined weight of the pilot, equipment and glider.

8. Towing to be carried out in a suitable environment, e.g. free of obstacles (trees, telephone poles and power lines etc.) - There must be reliable communication between the pilot and the winch operator.

9. A good pre-flight check of the glider and winch is necessary before every flight.
10. No launching on national roads is permitted without prior arrangement with the involved parties.

Pay - Out Winch:

All pay out winches must be fitted with the following safety devices:

1. A tow line tension indicator. Alternatively an adjustable stop is required to limit the maximum line tension, and a means is required of checking that tension between launches. The smoothness and efficiency of winch brakes has been found to vary considerably between launching sessions (depending on storage conditions) and also as they warm up with use. Winches should be stored under cover and checked frequently when in use.

2. If internal expanding brakes are used it is recommended that they are of the double trailing shoe type.

3. There must be an operator controlled, single action, effective means of cutting the tow line at the vehicle immediately in an emergency (e.g. a guillotine or cutting tool). A fixed wire cutter or guillotine is required for a wire tow line.

4. A tow line weak-link of the correct breaking load.
5. The end of the line, which may have a flag or streamer, must be free to pull clear of the drum.
6. There must be a means of distributing the line across the drum during rewind.
7. A secure seat is required for the winch operator so that he can operate the brake smoothly during a rough ride.
8. Recommended trailer dimensions are: hitch to wheel axle(s) 1.8m (6 ft); minimum wheel size 13 inches

Notes on towing

Tow tension in the early stage must be kept at a steady level which just allows the canopy to ascend. Too high a tension will cause the wing to pitch up to an unsafe angle.

Winching Team:

It is essential to have a good and qualified team for a safe launching. Every member of the team must know his/her duties and are responsible for the safety of the whole operation. With normal procedures a team will consist of 2-3 members namely;

- Winch Operator / Driver
- Pilot

Winch Operator:

The winch operator is the most important person in the team for he is responsible for the safety and in charge of the complete operation. He is responsible for the speed of the towing vehicle, tension of the winch and safety of the pilot and the crew. He gives the commands during a tow and ensures that the whole operation is running smoothly.

Procedures for the Winch Operator;

Do pre-flight inspection on conditions, pilot and winch;

1. Fast release
2. Tension of rope
3. Radio check
4. Obstacle free area
5. Wind strength and direction
6. Pilot leg-straps, chest-straps, carabiners and “release” all positive?
7. Take slack up slowly with vehicle and inform pilot that the tension is set.
8. Wait for the pilots command over the radio to “IDLE” and inform the driver as such.
9. Wait for the pilot to get the glider under control and complete his line check on the glider.
10. If there is any problems while on “IDLE”, pull the release and give the driver the command to STOP.
11. If the pilot has managed to inflate the glider properly and have it under control in ground handling – only then give the command “GO” to the driver. The driver will then give a smooth start from the “IDLE SPEED” and slowly accelerate up to 20 km/h. During this the pilot will run with the glider inflated for about 3-5 steps and get airborne.
12. When the pilot is airborne the tow operator must be sure to tow him at 30°- 45° on the rope. Never exceed 50°. If he is over 50° it means that there will be too much tension on the rope, in effect increasing the wing load dramatically and with results a complete “lock-out” as experienced with a kite in strong wind.

REMEMBER:

The Winch Operator should always keep his hands on the winch and his eyes on the pilot.
The Winch Operator must be always in control and prevent other passengers or crew from running the show.
Should the Pilot get into a dangerous situation, then they must loosen the tension immediately and pull the fast release slowly.

PILOT:

1. The pilot must be sure that the conditions are suitable for your experience level. - A complete pre-flight inspection like for normal Paragliding.
2. Lines (No tangles, obstructions etc.)
3. Glider
4. Harness, buckle straps - Release
5. Radio check
6. The most desirable take-off is into the wind. Pilots must never try a downwind take-off.

7. When the pilot is ready to take-off, the pilot will give the command “IDLE” to the winch operator. The vehicle will slowly start to move forward and the rope will tension.
8. The pilot will launch the glider as per normal paragliding, making sure the wing is free and steady for launch.

DRIVER:

1. The Driver and the Winch Operator are responsible for the safety of the Pilot.
2. The Driver must help the pilot with his pre-flight checks.
3. On command to “IDLE” the Driver must give a smooth idle speed pull-away to take up tension on the rope and pull the glider into an airborne state.
4. On command from the Winch Operator, “FASTER” or “ SLOWER”, do it with 5 km/h intervals.
5. No sharp turns or rapid stops are allowed.
6. Normal gear change is required, but use only 1’st and 2’nd gearing with as smooth as possible transition.
7. Watch the speed of the vehicle, and REMEMBER. THE SPEED OF THE VEHICLE MUST NEVER EXCEED 30 km/h during a tow, or rather THE GLIDER MUST NOT BE TOWED IN EXCESS OF 20 Km/h AIRSPEED.

Licensing Under Kenya Paragliding Association (KPA)

Paragliding pilots in Kenya will have been flying in Kenya without any official national license. This was due to the fact there has been no association or governing body issuing licenses.

We propose that after a local pilot has shown the ability to fly safety and in a competent manor, we can issue them with the appropriate Kenyan Paragliding License. Based on their level.

Kenyan Paragliding Licenses will be split into different grades, for pilots with different abilities. Minimum is Para Pro 3 (Club Pilots who are able to fly independently without the presence of an instructor). Increasing up to Para Pro 5 for those capable of cross country flying.

Tandem Pilots. - Pilots who have previously gained a tandem rating from an internationally recognised organisation such as APPI, or IPPI, may be issued with a tandem rating as part of their Kenya Paragliding License. This allows a pilot to take passengers using a certified tandem paraglider.

Instructors - Instructors who hold instructor licenses from international paragliding associations, may be issued with an instructors rating. This will allow them to teach Kenyan pilots following the proposed Training syllabus.

Kenya Paragliding Licenses, will cost a one off fee of 4,000 KES.

Visiting Pilots

Kenya welcomes visiting pilots to experience the great paragliding that Kenya has to offer. Though to maintain a high level of safety within the sport of paragliding in Kenya, there are a few mandatory rules they must abide by.

Rules and Regulations visiting pilots must abide by before being allowed to paraglide in Kenya.

1. Visiting pilots must contact RAAK / KPA prior to flying.

2. They must apply for a visitors flying permit, providing proof of a valid national license, or a valid IPPI / APPI card.

3. Permit will be valid for a year and will cost 4,000 KES.

4. Permits are only valid along side a valid national license, or a valid IPPI / APPI card.

5. It is a visitors own responsibility to ensure that they have up to date knowledge of current air laws in Kenya.

6. It is a visitors own responsibly to ensure that they have all necessary insurances to paraglide in Kenya. 3rd Party Liability, Health/Accident Insurance.

7. Visiting pilots will issued with an info pack, A guide about Kenyan Air laws, and information about sites.

A permit does not give a visiting pilot permission to take off or land on private land without the landowners prior permission.

Incidents

Paragliding is and should remain a safe sport. By maximising paragliding safety in Kenya, the sport and pilots can progress to new levels.

Unfortunately incidents do occur. This is why we propose that all accidents, incidents or near incidents should be a learnt from to help further increase safety.

Incidents should be reported by anyone witnessing or been involved in if it:

1. Involves injury, whether to participants or others.
2. Involves damage to property, third party or not.
3. May give rise to an insurance or legal claim.
4. Involves non-standard equipment or techniques
5. Involves failed or malfunctioned equipment
6. Highlights safety points or was unusual
7. Is something you feel the sport may learn from

Incident Forms should be completed and submitted to RAAK for analysis.

Proposed incident form.

1. Incident ID/Launch/Purpose/Weather
1a. Incident identification

Incident report submitted by *	Pilot involved in incident Witness
Date of incident *	
Time of incident *	
Country where incident occurred *	
Location where incident occurred *	
Name of flying site	

1b. Launch type

Launch type	
Discipline	

1c. Flight details

Purpose or type of flight	**Select** Training Competition XC Free Flight SIV
Phase of flight **(When incident took place)**	**Select** Take Off In Flight Approach for Landing Landing

1d. Weather Conditions

Wind speed (mph	Select 0 - 7 mph 8-12 mph 13-17mph 18-21mph 22-25mph 26-30mph 30mph +
Wind direction on the day	
Best wind direction for the site	
Please tick any of the following that apply to conditions on the day	

Calm	
Wind variable Wind speed high	
Thermals strong	
Turbulent	
Rotor	
Foehn	
Thunderstorm	
Rain	
Other conditions	

2. Pilot Information

2a. Personal information about the pilot involved in the incident

Association membership If other selected, please specify	
Membership No.	
First name	
Surname	
Address	
City	
Post Code	
Home Telephone number	
Mobile Telephone number	
Email address	
Nationality	
Gender	
Age	

Weight (kg)	
Clip in weight (kg)	

2b. Experiance

Pilot Rating	None Under Supervision Club Pilot Advanced Pilot Other
Pilot Licences	
IPPI - Para Pro Stage	
IPPI - Safe Pro Stage	
Years flying	
Flying hours	
Hours on type	
Total flights	
Time since last flown	

3. Equipment
3a. Glider/canopy

Wing Type	
Manufacturer	
Model	
Size	
Glider/canopy purchased	**New Secondhand**
Total flying hours of glider/canopy	
Date of manufacturer of glider/canopy	
Glider/canopy certification	**DHV: LTF : CEN: Registered Prototype: Not Certified:**

Canopy certification grade (eg. A, B, 1, 2/3)	
Modifications	
Accessories	

3b. Harness

Manufacturer	
Model/type	
Padding type & thickness (if paragliding harness)	

3c. Helmet

Type	**None Open face Full face**
CE966 approved	**Yes No**

3d. Emergency parachute

Manufacturer	
Model	
Age	
Size	
Certification	

3e. Power Unit

Manufacturer	
Model	
Age	

Modifications	

4. Incident description/Injuries

4a. Narrative report
Please provide as much factual information as possible.
If you wish to attach a sketch or photo, you can do so on the final page of this form.
If you wish to submit more than one attachment, please zip them into a single file before attachment to this form.

What led up to the incident?	
What was the student/pilot briefed to do, or what did he say he would do?	
Describe the incident	
What happened after the incident?	

4b. Emergency parachute deployment

Parachute deployment	**No** **Successful** **Failed** **Accidental**
If parachute deployed, height of deployment agl in metres	

4c. Contributory factors
Please indicate if you believe any of the following factors contributed to the incident, and if so were they major or minor factors

Inexperience	No	Major	Minor
High Wind:	No	Major	Minor
Low Wind:	No	Major	Minor
Turbulence:	No	Major	Minor
Stall/tuck:	No	Major	Minor
Confusion/froze:	No	Major	Minor
Overconfidence:	No	Major	Minor
Equipment	No	Major	Minor
Insufficient lookout:	No	Major	Minor

Traffic density:	No Major Minor

4d. Injuries

Person(s) injured **(Please tick as appropriate)**	Pilot 1: Pilot 2: 2nd Pilot (dual) Ground crew: Course member: Third party:
Injuries sustained	
Medical response **(Please tick as appropriate)**	**None Requested** **First Aid** **Hospital Admission**
Name of hospital and town **(if casualty or admission selected)**	

5. Witnesses

Full name	
Address	
Post Code	
Telephone number	
Email address	

6a. Incident reported by

Full name *	
Address *	
Post Code *	
Telephone number *	
Email address *	
Membership number	