IPPI Card Information

February 2015

Dear Pilot,

Congratulations on your new International Pilot Proficiency Identification Card. We are sure that you will find this very helpful flying from different sites in your country and during visits to fly in other countries.

The IPPI Card provides a standard reference by which all national rating programs may be compared. When you travel abroad this card, together with your national rating card, will identify your pilot skills. It gives flying site managers, instructors and others responsible for hang gliding and/or paragliding flight operations an easy way of verifying your pilot experience level prior to approval of flight activities.

The SafePro Delta and/or ParaPro stage on your card reflects your pilot proficiency. Please note that SafePro Delta is for hang gliding and ParaPro is for paragliding. You can see from the enclosed synopsis of SafePro Delta and ParaPro what the different stages are.

The card is valid only together with a current national licence or rating card.
Please note that the IPPI card does not give you any insurance cover. Please also remember that your flight safety is ultimately your own responsibility. We recommend that you always fly conservatively both regarding the conditions you choose to fly in and the safety margins you allow in your flying.

Even when you have reached the highest stage in SafePro Delta and/or ParaPro systems there is still a lot to be learned and experienced. The FAI/CIVL international badge system offers you an opportunity to rate your skills from the basic cross country stage to advanced cross-country flying.

The IPPI card was introduced in 1992.

Since then, associations and pilots throughout the world have benefited from its internationally recognized standards.
The IPPI Card provides a standard reference by which all national rating programs may be compared.
The SafePro Delta (for hang gliding) and/or ParaPro (for paragliding) stage on the card reflects the pilot proficiency. For the pilot who flies outside of his known or local area, it is a quick and easy method of providing proof of flying experience and proficiency.
When a pilot travels abroad, the IPPI Card – together with the national rating card – will identify the pilot skills. It gives flying site managers, instructors and others responsible for hang gliding and/or paragliding flight operations an easy way of verifying the pilot experience level prior to approval of flight activities.
The IPPI Card is valid only together with a current national licence or rating card.

Since October 2015, the IPPI Card is available in two ways

1 – Per IPPI level.
The IPPI Card is physically bought and sold by the approved association to pilots who ask for it. It is not necessary to renew the IPPI Card except when a change in the pilot national licence invalidates the IPPI Card. For example, if the pilot receive a higher national ranking which corresponds to a higher stage in the SafePro Delta or ParaPro system, a new IPPI Card should be issued.

2 – Per year.
The IPPI Card is a logo on the pilot national licence. The approved association has agreed to issue the IPPI Card to all its licensed pilots for a small yearly fee. Licences are renewed every year, so your IPPI level can be adjusted accordingly.
Associations in France, Italy, Hungary and Serbia have adopted the new scheme in 2015.

Please note that:

- The IPPI Card does not give any insurance cover.
- Flight safety is ultimately the pilot own responsibility.
- CIVL encourages all pilots to use the IPPI card.
- CIVL would also like all national hang gliding and paragliding associations to promote the IPPI Card. To this end, it recommends that an IPPI Card information pack should be sent out with all licence and membership applications, as well as registered hang gliding and paragliding schools and clubs.

Issuing IPPI Card

The approved association that is the issuing authority for the IPPI Card can be the FAI member organization (usually a NAC) or its designated representative (usually a federation) or any association approved by CIVL.

- All FAI member organization are allowed to issue IPPI Card.
- CIVL may choose other associations responsible to issue the IPPI Card.
- CIVL may request explanation on the price the IPPI Card is sold for.
- CIVL may withdraw the right to issue the IPPI Card for any reason, including price abuse.

If the issuing authority is of a nation other than the applicant's nationality, the nation of issuance must also be noted here.

The sample application form found on CIVL website is for the use of the issuing authorities only. No individual application can be made directly to the FAI using this form.
Pilots are invited to contact the issuing authority to obtain an IPPI card.

Issuing authority that wants to join the IPPI Card Programme, order or renew their stock of cards can get more information, the price list and payment information from the FAI Office.
Please contact:
Fédération Aéronautique Internationale — Maison du Sport International
Av. de Rhodanie 54 — Ch — 1005 Lausanne — Switzerland
Attention : Christine ROUSSON — Email : christine@fai.org
Tel : +41 213 451 070 — Fax : +41 213 451 077

IPPI Card price structure in 2016

Per IPPI level

1 to 99 pieces: 3 euros per piece.
100 to 499 pieces: 2.75 euros per piece.
500 to 999 pieces: 2.50 euros per piece.
1000 to 4999 pieces: 2.25 euros per piece.
5000 and more pieces: 2 euros per piece.

Per year

0.20 euro per pilot.

An additional fee might be added by the issuing authority for administrative costs.

CIVL Proficiency Badges

CIVL proficiency badges are standards of achievement, which do not require to be renewed. They are intended to provide a graduated scale of difficulty to measure and encourage the development of a pilot's flying skill, particularly in cross-country flying.

The Bronze badge should be achievable by most pilots within the first year of active flying and landing accuracy, with the silver following in the next year or two. The gold badge should be achievable for most pilots within the first five years of cross-country flying. The diamond badge should be achievable by perhaps half of all pilots within ten years of flying.

In any one year, we would expect that for advanced-rated (IPPI 4 or 5) pilots, the bronze badge distance would be flown by 100% of them, the silver badge distance would be flown by more than 75%, the gold badge distance would be flown by 50%, and the diamond badge distance would be flown by perhaps 15–25%. Results may vary from one nation to another, however the qualifications are the same in every country. Delta badges are for pilots flying hang gliders in class 1, 2 4 and 5. Paragliding badges are for class 3. Accuracy badges are for Paragliders.
Requirements

Any type of open or closed course may be used for the distance requirement of the Delta and Paragliding Bronze, Silver and Gold badge. For the Delta and Paragliding Diamond badge, the open course may be either straight distance or distance via 3 turn points. The closed course may be out-return, or triangles of any shape.

Delta Bronze Badge

Distance	30 km
Or Duration	1.5 hours
Or Gain of Height	500 m

Delta Silver Badge

Distance	100 km
and Duration	3 hours
and Gain of Height	1000 m

Delta Gold Badge

Distance	150 km
and Duration	5 hours
and Gain of Height	2000 m

Delta Diamonds

There are three separate Delta Diamonds, which may be obtained independently from each other

Diamond Open Course:	300 km
Diamond Gain of Height:	3000 m
Diamond Closed Course:	300 km

Paragliding Bronze Badge

Distance	30 km
Or Duration	1.5 hours
Or Gain of Height	500 m

Paragliding Silver Badge

Distance	75 km
And Duration	3 hours
And Gain of Height	1000 m

Paragliding Gold Badge

Distance	125 km
And Duration	5 hours
And Gain of Height	2000 m

Paragliding Diamonds

There are three separate Paragliding Diamonds, which may be obtained independently from each other

Diamond Open Course:	200 km
Diamond Gain of Height:	3000 m
Diamond Closed Course:	200 km

Bronze Landing Accuracy

Four consecutive landings within 1m of the centre of the target

Silver Landing Accuracy

Four consecutive landings with a total score of 1m or less

Gold Landing Accuracy

Four consecutive landings on the pad within 10cm of the centre of the target

Diamond Landing Accuracy

Four consecutive landings with a combined total of 10cm or less

Special Conditions

The pilot shall be alone on the hang glider.

For soaring badges, flights may be completed in any order and any flight may count for any badge for which it fulfils the requirements.

For Accuracy badges, flights shall be completed in FAI sanctioned competitions, and the scores shall be validated in the final results of the competitions.

Issue of Badges

Badges shall be issued by the appropriate NAC, which shall keep a register of pilots' names and dates of completion of the badge flights.

FAI Sporting Licence Requirements for Badge Flights

A FAI Sporting Licence is required for badge flights. An official observer is recommended for soaring flights, but is not required provided an acceptable validation method is used (e.g. WXC, OLC, Leonardo, etc.). In Accuracy flights, the Chief or Event Judge will validate the scores, which are then included in the competition results.

Fédération
Aéronautique
Internationale

SAFEPRO DELTA

RECOMMENDED SAFETY PROFICIENCY STANDARDS FOR HANG GLIDING

2016 Edition

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Note

In all the following text, "he", "him", "airman" refer to both female and male students / pilots.

SafePro Delta
A Hang Gliding Safety and Training Program*

by Stein Arne Fossum - Raymond Caux

The history of hang gliding has been written in a few years, where new barriers have been broken virtually every day. It has developed into a full-blooded aviation activity, meaning it is no longer simple and easy to learn, potentially more dangerous for the "self-learners", while the opposite may be true for the ones receiving proper training.

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

Looking at the levels of flying already reached (limited to foot launch, no power) along the history of hang gliding, we see 5 distinct stages. The following program basically keeps the safepro* philosophy, putting these stages together in a training system.

5 stages of hang gliding

1. **Ground Skimming** (Not flying higher than you would care to fall)
2. **Altitude Gliding** (Altitude and space to do maneuvers, 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 one (a building block system) requiring new knowledge and skills. It is a natural "ladder", where a student should climb to progress safely in his hang gliding career. There are other steps, such as changing to another harness, or learning to fly a new site or a new glider.

Additional stages like Aerobatics are considered as unsafe for the general pilots until now. They should therefore only be performed by specialists using a strict expert program, until safe methods are found to make them available to everyone.

To be very clear, there is no reason today to try to learn alone. All the previous experience would be useless and the chance of accident very high. Some accidents were unavoidable because of the pioneering nature of the sport (Lilienthal was the first one), while others could have been avoided simply by proper training.

Analysing why most accidents caused by "pilot error" happen, one finds that either the pilot tries to perform a task or meet a condition he is not able to master, or he simply does

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* Note: This text was originally written by Stein Arne Fossum in the SAFE PRO system in 1980-1982, updated and completed by Raymond Caux in 2013 to suit different methods of instruction (slope, towing).

something that should not be done. Seing the hang glider plus its equipment like an aircraft as a whole can also help against classical errors like forgetting to hook in.

Today we have enough knowledge to avoid most of such accidents, either collected by the hang gliding community itself or available through other air sports. We know how a task should be performed correctly or what are the limitations not to exceed (any motor or glider pilot knows cloud flying is dangerous, and it is hence unnecessary to rediscover it).

Accidents are also 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. These steps are filled with instruction.

Pilot's Ability in hang gliding: It can be broken down to **4 Qualities**:

- **Knowledge**
- **Skills**
- **Experience**
- **Airmanship**

Knowledge and **Experience** are only "tools" used to improve a pilot's **Ability**. They are however of good value in the learning process and as such can hardly be overestimated. The pilot certainly also must show good **Airmanship**, which a good instructor is able to spot often before he is even in the air, but it is difficult to measure and diagram.

Skills can best measure a pilot's ability, since hang gliding is a practical activity. It means his way of performing maneuvers, links of maneuvers, tasks, and how he masters flying conditions and new situations.

Based on the above statements, the training system proposed here is built as a natural progression, mainly developing and measuring the pilot's **Skills**, although the other 3 qualities have found their place.

For instance, **Airmanship** is expressed by the pilot having:
– either a **Student Licence**, when he lacks the necessary airmanship. As such he is under a training system, controlled by an instructor and all his flying shall be in accordance with the instructor's guidelines;
– or a **Pilot Licence**, showing he is mature enough to take care of his own flying, seeking further instruction when needed. He does not "know it all", but merely can take care of himself at his current stage. When he wants to progress to a higher stage, he seeks instruction before going out on his own flying.

Colour Codes ("Black belt" in Hang Gliding): The stages are colour coded from yellow to brown for easy identification. The student can wear visible markings that identify him, as well as his stage. Apart from being a good site control system, it gives the students and pilots insight in what they are up to.

Note: A "black" or Master grade may be considered as the top level. This grade should express the ultimate in Knowledge, Skills, Experience and Airmanship.

SafePro Delta, general description

Objective: The program aids and assists the participants to progress safely and become true airmen. They must be able to enjoy the beauty and freedom of the sport, without risking injury or restrictions due to their own and others' lack of ability. The students need time to develop until they can operate alone within the objective above. This is developed most efficiently, enjoyably and safely through a motivating program. The students' operational freedom is expanded gradually, without jeopardizing safety, by breaking down the way into easily identifiable blocks attainable by most people.

Program: It consists of 5 natural stages, from the easy to the more difficult, from low to high, from basic to advanced, being careful not to leave any gap on the way. It also divides the participants into students and pilots, indicating whether they are autonomous or not. All previous stages will be reminded in the beginning of a new stage, for each chapter.

1	Ground skimming	Yellow	Student
2	Altitude gliding	Orange	Student
3	Ridge soaring	Green	Student
4	Thermal soaring	Blue	Pilot
5	Cross country	Brown	Pilot

Participants

Student: He is under training, and is considered to have limited ability to take care of his own and other people's safety. He is not yet able to evaluate all safety elements, make sound decisions and act accordingly without the supervision of an instructor.

Pilot: He can take care of his own and other people's safety within applicable rules, regulations and code of good practice. He can evaluate all safety elements, make safe and sound decisions and act accordingly on his own, or obtain further instruction, information and assistance at his own discretion.

Recommended limitations

Students shall always fly under supervision of an instructor, and before all ratings are reached, under direct supervision of an instructor. They shall use only hang gliders and harnesses suitable for them and on which they have been checked out by an instructor. Tuning and repairs shall be made only when approved by an instructor.

Pilots are expected to be familiar with and to follow all applicable national aeronautical regulations and local flying site rules. They shall not participate in demonstration, competition or other organised flying requiring higher standards than they are rated for.

Minimum age: The minimum recommended age is 14 years old, with a written permission of parent or guardian and a medical agreement* below 18 years.

* Note: based on minimum requirements (1,50 m / 4.90 ft, 45 kg / 99 lbs, no spine problem)

SafePro Delta, stage elements

Knowledge

Students stages 1, 2 & 3 shall be given the lectures, briefings, discussions and written tests to ensure the knowledge required at the current stage is acquired. The requirements should not restrict from giving more instruction, the pedagogy being left to the instructor. However one must not forget that especially beginners have limited capacity to "absorb" many advices, which should then be limited to those necessary for the very proposed task.

Before a student is signed off at a completed stage 3, he shall pass a written test on air law, applicable regulations and code of good practice, ensuring he has the necessary knowledge to operate alone, safely and correctly at sites and in the air.

Pilots stages 4 & 5 may at their own discretion acquire the required knowledge, either attending 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.

Skills

Students stages 1, 2 & 3 shall be given the necessary instruction in each practical skill, once the basic theory, aim, normal procedure, mistakes, dangers and their corrections, and safety aspects are known. Each skill shall be practiced until the instructor is convinced it is mastered. The skills may be signed off progressively as the criteria are met, hence a special flight test may not be necessary.

Pilots stages 4 & 5 may at their own discretion, within acceptable safe methods, acquire the necessary instruction for each skill. Before they are signed off, they shall be demonstrated to an instructor, who shall be convinced they are mastered.

Experience

Experience shall ensure that the knowledge, skills and airmanship have been practiced a minimum of times in various situations. Exercise, drill and practice are important to meet the objective of all true learning, which is to effect behavioral changes.

The experience requirements shall be documented by a logbook or reliable witnesses. The instructor or observer shall be convinced that the minimum requirements are met.

Airmanship

The instructor or observer shall be convinced 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.

SAFEPRO DELTA STAGE 1, GROUND SKIMMING (YELLOW)

Ground skimming is gliding near the ground over smooth terrain, normally below 5 meters.

Instructional and safety recommendations

Objective: This stage introduces the student to hang gliding and enables him to discover the first feelings of flying within safe limits, as well as it prepares him for the next stage.

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

Methods: Teaching has been traditionally on training slopes. However, flying close to the ground asks for a precise control with few time to react and makes hang gliding among the most demanding airsports. To start with the easiest, that is controlling a straight flying line before teaching to take off and land, alternative methods are available now, like static flying (on a driven platform or in the wind, with assistants or links holding the glider in a defined volume), winch towing with low tensions close to the ground, or aerotowing with a complete method including tandem first flights and an adapted release system. Only a couple of minutes of in-flight control, or even just displaying a film from an onboard camera can dramatically ease the student's first steps.

Proper environment: This is with smooth terrain, preferably snow, sand, grass or gravel, with a profile that allows for ground skimming with the type of hang glider in use. The takeoff and landing areas and the space between should be free of obstacles and other hazards with a good margin to any side. It should be possible to do the whole flight in close to a straight line.

It is warned against attempts to take off and fly in unstable conditions, cross, down, strong or gusty wind. The student shall not practice slow flight and stalls (except for the landings) or more than gentle turns with only small diversions form the flight path.
To try to work any type of lift can be especially dangerous. The reason is the closeness to ground gives little time or altitude for corrections. He shall also avoid flying alone.

When all rating requirements have been met, the student shall, when flying without direct supervision of the instructor, only fly in beginner environment in stable conditions with light and smooth headwinds.

Before progressing to the next stage, it is of vital importance that the student know the basic theory and master all skills, since weaknesses here may lead to the most serious consequences when he gets higher and flies in more difficult conditions. It is especially important that he demonstrate correct procedures, routines and checks in his preparation before flight, to ensure nothing is forgotten, overseen, wrongly assembled or adjusted. Equipment failures, malfunctions or failures to hook in are best avoided by developing proper habits from the very beginning. He must be competent in good takeoff techniques, speed and directional control, and landings.

SafePro Delta Stage 1, Knowledge requirements

Human

1 **Physical factors**: Fitness and exhaustion, hydration, food, skin and eye protection, alcohol and drugs.
2 **Psychological factors**: Interest, motivation, fear of height, vertigo.

Aircraft

1 **Terminology**: Material and parts.
2 **Safe equipment**: Helmet, boots, gloves, clothing, wheels, nose skid.

Aerodynamics

1 **Nature of flying**: Always dependent on continuous forward airspeed.
2 **Driving forces**
  a **On the ground**: By running.
  b **In the air**: Weight (gravity).
3 **Lift**: Axes, difference in pressure from profile, airspeed, angle of attack.
4 **Airspeed, groundspeed**: Why take off and land into the wind.
5 **Control movements**: Weight shift, banking, turning, airspeed control.

Meteorology

1 **Wind**: Wind meters, natural indicators and signs.
  a **Velocity**: m/s, km/h, knots or mph.
  b **Direction**: Compass and quadrant (head or up, tail or down, crosswind).
  c **Force**: Increases with the square of the wind velocity, effects, dangers.
2 **Conditions**: Recognition of safe and dangerous conditions.
3 **Turbulence, gusts**
  a **Mechanical**: Behind or lee of obstructions, trees, buildings, hills.

Rules

1 **Insurance**
2 **School and training**
3 **Code of good practice**

Safety

1 **Preparation**: Standard routines and checks, double checks of critical factors (consider hang glider + harness as a complete aircraft).
2 **Exercises**: Description, intention, procedures, execution, errors and dangers.

SafePro Delta Stage 1, Skills requirements

1 **Transport, care**: Of hang glider and equipment.
2 **Equipment routines**: assembly (as much as equipment allows it, hook in harness before putting it on), adjustment, preflight checks, disassembly (as much as equipment allows it, remove harness before unhooking it).
3 **Ground handling**: Carrying, moving and parking hang glider.
4 **Final check**: Connection, conditions, visualising run or flight, glider attitude, clear area.
5 **Running, stopping a run**: On flat ground and in slope, using glider as a brake.
6 **Takeoff**: Sight forward, smooth acceleration, feeling glider lift off.
7 **Flight control**: Correct airspeed and directional control, smooth corrections.
8 **Landing**: Directly into wind, sight forward, using glider as a brake.

SafePro Delta Stage 1, Experience requirements

1 At least **3 practice days**.
2 At least **10 successful attempts**.

SafePro Delta Stage 1, Airmanship requirements

The instructor shall be convinced that the student can take care of his own and others' safety while ground skimming, without direct supervision, within the instructional and safety recommendations given.

SAFEPRO DELTA STAGE 2, ALTITUDE GLIDING (ORANGE)

Altitude gliding is gliding with enough height and distance from the terrain to be able to maneuvre relatively freely.

Instructional and safety recommendations

Objective: This stage introduces the student to gliding with height and distance to the terrain, enables him to enjoy flying within safe limits, and prepares him for the next stage.

At this stage, the student gradually becomes accustomed to flying well clear of the ground, and should lose possible height anxiety. He finds that he is actually safer in with altitude, time and space to maneuvre and correct for possible mistakes.

Proper environment: The takeoff, landing area and the flight path between them are easy and with good margins to any obstacle or other hazards. The takeoff area shall be smooth and allowing for acceleration to flying speed before getting airborne (no cliff launch). The landing area shall be large and easy to reach by normal maneuvering with a good margin of height. There shall be an established two-way communication between takeoff and landing if the landing area cannot be seen from takeoff.

Planning is the key word. The student must now plan and prepare for each flight. He learns and practices the basic maneuvers, such as speed control, coordinated turns and combinations of them, light stalls, correction for wind drift and precision approaches and landings. The planning starts even before takeoff and continues all the time. He must be ahead of the events, observe, evaluate, decide and act accordingly, like in all aviation.

Drift and margins: All maneuvers shall be done into the wind to avoid drifting and hence not being able to reach the landing area. Advanced maneuvers like 360° turns, stalls and slow flying shall be performed with extra caution and sufficient height and distance to the terrain to allow for corrections or recovery upon loss of control. Turns, downwind flying and slow speeds close to the ground shall be strictly avoided. Approach shall be planned in good time and with good height. The student shall also avoid flying alone.

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. Poor planning, preparation and takeoff techniques may result in equipment failures or malfunctions, or failure to hook in, which may have the most serious consequences.

When all rating requirements have been met, he shall, when flying without the direct supervision of an instructor, only fly in beginner or intermediate environment with light to moderate (0-5 m/s, 0-20 km/h, 0-10 mph) smooth winds. Takeoffs shall only be done in approximately headwind. Lift or turbulence shall be avoided, or if not possible, flown straight through to calmer conditions in order to land in the ordinary landing area.

Before progressing to the next stage, it is of vital importance that the student know the applicable theory, master airspeed control in the lower speed range and be able to recognise and correct for stalls.

SafePro Delta Stage 2, Knowledge requirements

Human

1 **Learning process**: Description, objectives, individual progress, safety.
2 **Psychological factors**: Recognition of own ability, emotions management.
3 **Commando principle**: Necessity to complete any started flight.

Aircraft

1 **Glider handling**: Axes, roll and yaw coupling, trim, slow flight and stalls.
2 **Harness tuning**: Fixing harness position and comfort.
3 **Rescue system**

Aerodynamics

1 **Load**: Weight, G-force, in turns, pull-outs, lift gradients, gusts and turbulence.
2 **Drag**: Increasing with airspeed and angle of attack, parasitic, induced.
3 **Drift**: Head or tail wind, crabbing, corrections in turns, penetration.
4 **Stall**: Description, secondary, in wind and lift gradients, downwind, in turbulence and gusts, dangers, recognition, avoidance and recovery.

Meteorology

1 **Wind**: Airflow from high to low pressure (sample: water flow), Coriolis effect, at takeoff, in landing and along the flight path, indicators, gradient.
2 **Breezes**: Creation, sea, mountain, valley, strength, effects.
3 **Local conditions**: Terrain effects, valley, Venturi effect, obstructions, corners, rotors.
4 **Turbulence, gusts**
  a **Wind shifts and shears**: Descriptions, dangers.

Rules

1 **Local and site(s)**
2 **Right of way rules**: crossing, slope, thermals, aircraft categories priorities.

Safety

1 **Flight planning**: Process, information, observation, evaluation, decision, execution.
2 **Flying exercises**: Description, aim, procedures, execution, errors and dangers.

SafePro Delta Stage 2, Skills requirements

1 **Planning**: Insight, evaluations and decisions, flight plan, axes, drift, height, marks.
2 **Final check**
3 **Takeoff**: Start position, even acceleration, correct speed, transition to lying position.
4 **Speed control**: Trim, minimum sink speed, best glide angle.
5 **Shallow turns**: Visual check, gentle to medium bank, coordinated, drift correction.
6 **Approach**: Setting relative to terrain and wind, types of approach, stand up and hands in piloting position, straight final, gradient prevention with speed.
7 **Landing**: Aiming towards a preset area, speed bleed off and feeling trim speed, hands in push out position, slow flight and mushing are not allowed.
8 **Ground handling**: Checking traffic, leaving landing for next pilots.

SafePro Delta Stage 2, Experience requirements

1 At least **6 practice days**.
2 At least **10 flights**.

SafePro Delta Stage 2, Airmanship requirements

The instructor shall be convinced that the student is able to take care of his own and others' safety, while altitude gliding within the recommendations given.

SAFEPRO DELTA 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

Objective: This stage introduces the student to soaring flight and makes him able to practice and enjoy soaring within safe limitations. He shall also become qualified as pilot, able to operate alone in a defined frame and be responsible for his further progression.

Soaring has many stages, from easy conditions and maneuvers with large margins to extreme conditions with minimal margins. When a pilot "masters the art", it seems quite simple and in a sense it is. However, this should not mislead anyone into believing that it is easily mastered. Lack of knowledge, misjudgement, wrong maneuvering, ignorance or gambling may easily end up in a serious accident.

At this stage, the student gets more airtime and the flying can get automated, but there is less room for mistakes and errors. His experience is still low, any setback needs to be avoided. A carefully planned progression is therefore important. Exercises shall be simple in the beginning, with large margins. Soaring requires preparation and a good ability to do precise and fast maneuvers. The launch and lower speed range control must be mastered, like coordinated turns with a minimum height loss, often close to the ridge, while calculating drift, keeping an eye on traffic and respecting traffic rules. He is also be able to recognize all kinds of stalls and execute prompt and correct recovery.

Proper environment: It is basically the same as in stage 2, plus mild conditions with a good margin to other traffic and the terrain. In ridge soaring with a wide lift band, the student shall not return to the lift he has flown out of. Flying in strong wind (above 8 m/s, 30 km/h, 20 mph), turbulence, cliff or crosswind launches, top or into the hill landings are not allowed. In flatland, he shall fly in smooth thermals (late afernoon or overcast sky). An instructor should be present. At first, there shall still be a communication between an instructor and the student, but he shall become autonomous during this stage.

It is warned against too fast progression, overconfidence, inattention, ignorance, gambling, misjudgement and lack of skills. The "intermediate" or "Icarus syndrome" means believing he now knows and masters everything, and that neither himself or the equipment have limitations... He will operate in stronger winds with smaller margins. Already upon ground handling can accidents happen. He must ask for qualified assistance when moving the glider and launching in strong or gusty winds. Poor technique or distractions leading to loss of airspeed or directional control when launching, like getting into flying position in a stirrup or cocoon harness, can result in a turn back to the ridge. Strong wind and turbulence may easily lead him to the lee side, or let him drift over dangerous / unknown terrain. He shall still avoid flying alone.

When all rating requirements have been met, he can fly freely within safety limitations, and as long as a higher stage is not required by rules or regulation. He has the responsibility to seek further instruction when necessary. It is recommended in the beginning to use the rules for students above as a guidance for safe flying.

Before progressing to higher stages, the pilot shall have a variety of experience from different sites and conditions. The process of flying shall be automated, so that reactions be fast and correct in the different situations / exercises he has to master.

SafePro Delta Stage 3, Knowledge requirements

Human

1 **Process of flying**: Insight, continuous evaluations, decisions, actions, being ahead.
2 **Pilot in command**: Responsibilities, abilities, command and control.

Aircraft

1 **Clothes**: For endurance, altitude and cold.
2 **Instruments**: Variometers, altimeters, airspeed indicators, tuning.
3 **Performance**: Minimum sink, maximum glide and speed, penetration, maneuverability.
4 **Maintenance**: Daily and periodical inspections and care, qualified tuning and repairs, inspection after repairs.

Aerodynamics

1 **Wing tip vortices**: Creation, behind aircraft, ground effect.
2 **Spin**: At takeoff, turning, turning downwind, spin recovery, wind gradient, in landing.
3 **Spiral, skid and slip**
4 **Design factors**: Airfoils, area, aspect ratio, taper, twist, dihedral, effects.

Meteorology

1 **Ridge lift**
   a **Factors**: Shape and gradient of slope, wind direction and velocity.
   b **Components**: Horizontal, vertical, gradients, acceleration.
   c **Zones**: Strongest lift, strongest headwind, turbulence, lee, rotors.
2 **Thermals**
   a **Factors**: Uneven heating, instability, lapse rates, contrasts, light to medium winds.
   b **Types**: Radius, strength, dry thermals, dangers.
   c **Signs**: Temperature drop with altitude, lulls and gusts, clouds, squall lines.

Rules

1 **National Hang Gliding Association**
2 **Government** or other official authorities
3 **VFR rules**: Minimum visibility and distances from clouds.

Critical situations

1 **Preparation**: Causes, recognition, avoidance, corrections, training (simulations).
2 **Poor takeoff**: Sight downward, poor glider attitude, brutal acceleration, poor contact with A-frame, wingdrop and turn back into hill, getting into harness.
3 **Stall**: In turbulence, unexpected lift, turns, gradient, downwind, dangers.

4 **Critical maneuvers**: Flying close to terrain and obstructions, slow flight, 360° turns.
5 **Poor approach and landing**: Unstructured, no clear plan, over landing field, low turns, slow flight close to terrain.

First aid

In accordance with appropriate authority's recommendations.

SafePro Delta Stage 3, Skills requirements

1 **Takeoff in wind**: Types, with assistance, instructions, start position.
2 **Turns**: Ordinary speed and on minimum sink, coordinated, no sign of stall.
3 **Maneuvering in lift band**: Figure 8 patterns, drift correction, reversing direction, maneuvering according to terrain and traffic, keeping a good lookout.
4 **Soaring**: Entering and maneuvering in lift, corrections and gradient, no sign of stall.
5 **Stall**: Straight ahead, in turns (safe distance to terrain), no whip stall, recovery.
6 **Precision approach and landing**: Safe and inside an area decided by the instructor.
7 **Landing in wind**: According to wind strength, traffic control, ground handling.

SafePro Delta Stage 3, Experience requirements

1 At least **30 successful flights**, from 3 different sites, of which 2 inland.
2 At least **7 flying hours**.

SafePro Delta Stage 3, Airmanship requirements

The instructor shall 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.

SAFEPRO DELTA STAGE 4, ADVANCED SOARING (BLUE)

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

Instructional and safety recommendations

Objective: This stage is to make sure the pilot can safely fly advanced soaring, also under pressure as in traffic, demonstrations and local competitions.

This stage has turbulence and small margins as key words. The pilot will operate close to the operating limitations for both the equipment and himself. Even while he certainly shall keep safety margins, they will become smaller. A thorough knowledge of emergency procedures, such as recovery from stalls, spins, spirals, sideslips or turbulence induced dives, of the use of parachute, is necessary. He knows the performance curves and correct flying speeds (speed polars), design limitations and load factors.

Advanced soaring requires the ability of fast and accurate evaluations of conditions and situations combined with fast and precise maneuvering. There will be situations with little time for balanced decisions and wrong reactions. The pilot plans carefully and is always well ahead of the situation, so that he give in critical situations the right reaction without spill of time. He has highly developed skills to gain maximum performance. He 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 radical conditions, because of the enormous forces that may be present. He must never overestimate himself or the equipment. Meeting strong turbulence, he does not panic with high speeds, since this actually increases the possibilities for structural failures or loss of control. Correct maneuvering in strong turbulence is actually medium speeds and a firm grip on the control bar at chest (safety position). Another danger is stalling close to the terrain. The right reaction is vital, it is first reducing angle of attack, then wait for speed to maneuvre and then avoid collision. He shall also avoid flying alone.

Before progressing to the next stage, the pilot must be able, with a great deal of accuracy, to evaluate conditions acceptable in relation to safety. He shall also show that he can find and use all kinds of lift.

Pilots must have a licence for this stage in order to fly advanced soaring in displays, demonstrations, local competitions or else where this stage is required. **Students** are under no circumstances allowed to fly advanced soaring.

SafePro Delta Stage 4, Knowledge requirements

Human

– **Psychological factors**: Confidence / overconfidence, group or self pressure, approval, self discipline, ability to give up.

Aircraft

1 **Harness selection**: Rating, experience, types of harnesses.
2 **Harness tuning**: Comfort, organisation, water, radio, all wires inside harness.
3 **Glider selection**: Size, handling, experience, type of flying, ambitions, performance.
4 **Glider tuning**: For maximum performance in the prevailing conditions.

Aerodynamics

1 **Airspeeds**: Speed polar, minimum sink, best glide angle, influence of lift / sink, of head / tail wind, turns, wing loading, air density.
2 **Stability**: Positive pitch, reflex, wing torsion, sail distribution versus centre of gravity.
3 **G-loads**: Speed in turbulence, pulling out of dives, aerobatics, structural failures.
4 **Airworthiness**: Design and certification standards, purpose and need, load, weight, speed and maneuvering range, stability, stall characteristics, rating.

Meteorology

1 **Weather**: Heat and pressure differences, global circulation.
  a **Airmasses, fronts**: Stability / instability, signs, convergence.
  b **Measuring**: Wind, pressure, humidity and stability.
  c **Clouds**: All types, associated weather and conditions.
  d **Reports**: Actuals (METAR), warnings (TAF), area (IGA), maps, interpretation.
2 **Frontal lift**: Cold front description, thunderstorms.
  a **Signs**: Towering clouds, squall lines, wind shift, temperature fall.
  b **Dangers**: Cumulonimbus, high winds, gusts, strong lift, turbulence.

Rules

1 **Information sources**: ICAO maps, publications, AIC, AIP, manuals, NOTAMs, information service, local airports and clubs, schools.
2 **Controlled airspace**: Control zones, terminal areas, airways, Air Traffic Control VFR/IFR traffic patterns, rules of operation.
3 **Uncontrolled airspace**: Information zones and services, VFR/IFR traffic patterns, rules of operation.
4 **Other airspace**: Restricted, dangerous and prohibited areas.

Critical situations

1 **Unfamiliarity**: With site, equipment, maneuvers or tasks, priorities, conditions.
2 **Ground handling in high wind**: Ground loops, turning glider after landing.
3 **Reduced visibility**: Flying close to clouds, reactions.
4 **Critical maneuvers**: Returning to lift band, top landing, spin recovery.

5 **Accidents**: Assistance and reports.
6 **Poor airmanship**: Overestimating own ability, underestimating site, conditions, equipment or task.

SafePro Delta Stage 4, Skills requirements

1 **360° turns**: From minimum sink to steep bank, correcting drift.
2 **Ridge soaring**: Best lift zone, best speed along the ridge, managing priorities.
3 **Thermal soaring**: Finding and following thermal cores, choosing exit direction.
4 **Speed range**: Exploring medium speeds.

SafePro Delta Stage 4, Experience requirements

1 At least **20 flying hours**.
2 At least **one 2 hours thermal soaring flight.**

SafePro Delta Stage 4, Airmanship requirements

The pilot shall be considered to be able to take care of his own and others safety while flying at this stage, also during displays, demonstrations, competitions and else where this stage in required.

SAFEPRO DELTA 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

Objective: This stage enables 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 conditions permit, the pilot's ability and his determination will set the limits. Here is the pilot's ability put to the ultimate test.

Cross country flying requires to plan, administer and perform each flight within safe limitations. The pilot has a thorough knowledge of aerodynamics, meteorology, traffic and airspace rules. In accordance with the planned flight, existing and possible conditions, he chooses correct equipment, organises retrieve, communication and procedures to use in an emergency situation. He is able to find all types of lift and fly at the correct speed. He can judge the terrain and conditions to avoid landing in prohibited or remote areas, or where he may cause injuries to himself or others. He can quickly choose the best landing field and set up a precision approach for a short field with possible barriers.

It is warned against cross country flying over areas with no possibilities for emergency landings and over water. He always makes sure that someone knows where he intends to fly, and that a search is activated if necessary. If there is any possibility for a landing in remote or deserted areas, he brings an emergency pack according to the conditions.

Pilots have a licence on this stage in order to fly cross country in displays, demonstrations or competitions or else where this stage is required. **Students** are under no circumstance allowed to fly cross country.

SafePro Delta Stage 5, Knowledge requirements

Human

– **Awareness**: Analysing, staying ahead, ability to give up, keeping energy for landing.

Aircraft

1 **Equipment**: GPS, emergency / first aid / survival equipment, oxygen, beacon.
2 **Maintenance**: Recognition of sail aging, tension tuning.

Aerodynamics

– **Gliding**: McCready theory, choosing thermal exit time and speed to fly.

Meteorology

– **Wave**
  a **Signs**: Terrain, wind direction and velocity, stability, lenticular clouds.
  b **Dangers**: Rotors, low penetration, strong lift, high altitudes, hypoxia, cold.

Planning

1 **Use of maps**: Airspace, deserted areas, hazards, landing areas, alternative routes.
2 **Procedures**: Signals, retrieval, warning, search after missing pilots.

Rules

1 **Controlled airspace**: Air corridors, terminal areas, control zones and airports.
2 **Uncontrolled airspace**: AFI, other airfields, dangers, restrictions, prohibited areas.
3 **Military traffic**: Training areas, photographying from the air.

Critical situations

1 **Unusual attitudes**: Turbulence, pitch ups and downs, safety position.
2 **Critical maneuvers**: Hillside landing, use of parachute, landing in trees, rough terrain, water, obstructed areas, electrical wires, using glider to absorb energy.

SafePro Delta Stage 5, Skills requirements

1 **Special launches**
   a **Crosswind**: Maximum 45°, side component less than 2 m/s, 7 km/h, 5 mph.
   b **Cliff launch**: In moderate to strong wind, assistance.
   c **Towing** (if possible): Winch and aerotowing.
2 **Speed range**: Exploring high speeds in smooth air.
3 **Turbulence, gusts**: Safety position.
4 **Out landings**: Selection of landing field, control of speed and glide angle, precision approach to unknown landing area, use of drogue chute.

SafePro Delta Stage 5, Experience requirements

1 At least **50 flying hours**.
2 At least **5 cross country flights** (flying lonely along the same ridge is not approved).

SafePro Delta Stage 5, Airmanship requirements

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

APPENDIX

Suggested visual markings for the SafePro Delta system

The students should have visual markings that shows the stage they are at. The following are suggested:

1 **Helmet badge**: With colour trim, matching the colour of the stage. The badges currently used in Norway are shown for each stage.

2 **Wind indicator**: Made of thin dacron with the correct colour coding. It should be attached to the front flying wires so as to assist the pilot in determining wind direction. We believe it is easier to get pilots to adapt to something they actually may have use for (instead of windstreamer on the kingpost). The type used in Norway has the Norwegian HGA initials printed on it., to prevent people from making their own, which may be mistaken for an original issued by the association.

International Hang Gliding & Paragliding Commission (CIVL)

Fédération Aéronautique Internationale

PARAPRO

RECOMMENDED INTERNATIONAL PARAGLIDING STANDARDS OF SAFETY AND TRAINING
2008 Edition

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THE PARA PRO
A PARAGLIDING SAFETY AND TRAINING ANALYSIS

by Stein Arne Fossum*

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:

5. CROSS COUNTRY

4. ADVANCED SOARING
(Soaring in turbulent conditions.)

3. BASIC SOARING
(Soaring in non turbulent conditions)

2. ALTITUDE GLIDING
(Altitude and space to manoeuvre, no soaring)

1. GROUND SKIMMING
(Don't fly higher than you would care to fall!)
(this stage is combined with stage 2)

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* **NOTE:** This article was originally written by Stein Arne Fossum when he made the PARA PRO system in 1980-1982. The names of the stages have been updated, but otherwise it is the original text (with a few additions). At some points it therefore may seem somewhat outdated, yet the principles described herein are timeless. Note that this document only applies to foot-launched paragliding flight at this time, with no mention of tow launches.

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.

We have additional stages like Aerobatics, Experimental and Power, all of which I personally consider unsafe for the general pilots at the present time. They should therefore only be performed by specialists using a strict professional program until safe methods are found to make them available to everyone.

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.

5. CROSS COUNTRY
(Brown)

4. THERMAL SOARING
(Blue)

3. RIDGE SOARING
(Green)

2. ALTITUDE GLIDING
(Orange)

1. GROUND SKIMMING
(combined with stage 2)

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 AIRMANSHIP 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.

The 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	Orange	Student
3.	Ridge Soaring	Green	Pilot
4.	Thermal Soaring	Blue	Pilot
5.	Cross Country	Brown	Pilot

PARTICIPANTS:

Students:

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 360^{o} 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:

Aerodynamics:

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.

Micro-meteorology (site conditions) and meteorology:

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. Airmasses 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. 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, 360^{o} 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.

First Aid:

In accordance with appropriate authority's recommendations.

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.: Of 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: 90^{o} - 180^{o}, 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 takeoff, 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. 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: Airmasses, 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 reports: Actuals (METAR), forecasts (TAF), maps. Where to obtain, interpretations.

9. 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.

   c. 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: 360^0 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 maneuvers: Use of parachutes. Landings in water, trees, rough terrain, obstructed areas, electrical wires.

m. Accidents: Assistance and reports.

First Aid:

Repetition of stage 2 theory.

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. Maneuvering 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 and level 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.

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:

Aerodynamics:

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.

Meteorology:

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.

Glider and equipment:

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. 360^{o} turns, shallow to medium bank, left and right.

4. 360^{o} turns steep, left and right.

5. 360^{o} 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 else where 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 (METAR), warnings (TAF), area (IGA), maps.

4. Interpreting weather: Signs, recognition of acceptable and dangerous conditions.

5. Airspace and air traffic:

    a. Controlled airspace: Air corridors, terminal areas, control zones and airports.

    b. Uncontrolled airspace: AFIs and other airfields. Danger, restricted, prohibited and alert areas.

    c. Military traffic: Training areas, photographing from the air.

    d. Governmental publications: AIC, AIP, Notam, ICAO maps.

6. Use of maps:

    a. Planning of flights: Dangerous/ deserted areas, alternative routs, landing areas, communication and retrieval.

7. Equipment: For altitude and low temperatures, emergency and first aid equipment, survival equipment, warning and communication equipment.

8. 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.

9. Standard procedures: Signals, retrieval.

10. 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. Outlandings: Precision approach to unknown landing area: Selection of landing field, control of speed and glide angle.

PARA PRO Stage 5, EXPERIENCE Requirements:

Same as for stage 4, plus.

1. A total of 50 flying hours.
2. 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.

APPENDIX

Suggested visual markings for the PARA PRO system:

The students/pilots should have visual markings that shows the stage they are at. The following are suggested:

A HELMET BADGE, with colour trim, matching the colour of the stage. The badges currently used in Norway are shown for each stage [not in this version of the document].