Francesco Daniele Padovano

GLIDER FLIGHT

INSTRUCTOR MANUAL

Development of the first period-basic course based on the EASA SFCL regulation of March 2020 with the introduction of competence criteria.

Development of a CBTA (Competence Based Training and Assessment) and related mission sheets.

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INTRODUCTORY NOTES

This manual has been conceived as a support for the activity of teaching gliding, both in its first period and in a second phase of improvement, and its main purpose is the unification of teaching criteria, raising the qualitative standard.

This second edition aims to introduce proficiency criteria in gliding training since, although the current regulations do not yet reflect this need, it is true that in the higher licenses EASA has already published two manuals in this direction, together with a series of references that cannot be ignored and not taken into consideration in the current SFCL regulations (introduction of TEM analysis, integration of the theoretical part in the theoretical part of the training), integration of the theoretical part into the practical part, the application of competence criteria with regard to non-technical skills) and the firm will of EASA to extend the competence criteria to all licenses, although the main reason is the advantage in terms of standardization and training quality of the introduction of competence criteria in the field of gliding.

On the other hand, greater importance has been given to the analysis of risks and their integration into the training program in its two aspects:

- Risks related to the flight itself and which every pilot in command must be aware of and take into account during his career.
- Risks specific to the flight missions and respective sessions that every instructor must be aware of during his performance as such.

The existing ICAO, IATA and EASA documentation on competencies, Competency-Based Education in Aviation Exploring Alternate Training Pathways by Suzanne K. Kearns, to the official text of the Italian Federation of Gliding (FIVV), edited in 2006 and written by Flavio Formosa, and to the basic texts used by the English BGA, the New Zealand NZGA, the French FFVV, the American SSA, and to the flying manuals commonly used in German, English and Italian schools. In particular, textbooks edited by Derek Piggott, Enrico Bergomi, Flavio Formosa, Leonardo and Riccardo Brigliadori have been used, as well as articles in the magazines Gliding, Volare e sport and safety articles published on the websites of various federations.

The flight mission sequences are inspired by various schemes already in use worldwide, such as those of the Italian and English schools, and in particular the specific manual for XAIR-IN operations, the purpose of which is to be used at any operational base, making the appropriate adjustments according to local conditions.

In this text, the focus is on the quality of training, for which it is introduced:

- Quality criteria in the performance and personality of the instructor.
- Fundamental and basic criteria for appropriate teaching taking into account
  - o teaching and learning techniques
  - o Influences of human factors during the training process.
- introduction of competence criteria, their meaning, use and benefits
- Introduction of assessment criteria
- Safety policy and its implications
- Specific analysis of common undesired states

A generalised syllabus with the most important missions with their relative TEM analysis and ICAO proficiency elements adapted to gliding is proposed as an example and is the result of my personal experience, as well as the progress records shown.

The order of the flight missions responds to criteria of general logic, although at the instructor’s discretion, weather conditions and especially depending on the student's progress, they may be anticipated or postponed, trying to maintain a logical sequence in any case.

In each mission, only one new argument will be introduced to avoid overloading the student, who will be able to use any surplus time to retake concepts previously presented.

The entire course will be subdivided into three distinct phases, written in worksheets:

Phase 1: contains all the necessary missions from the start to the first solo flight.

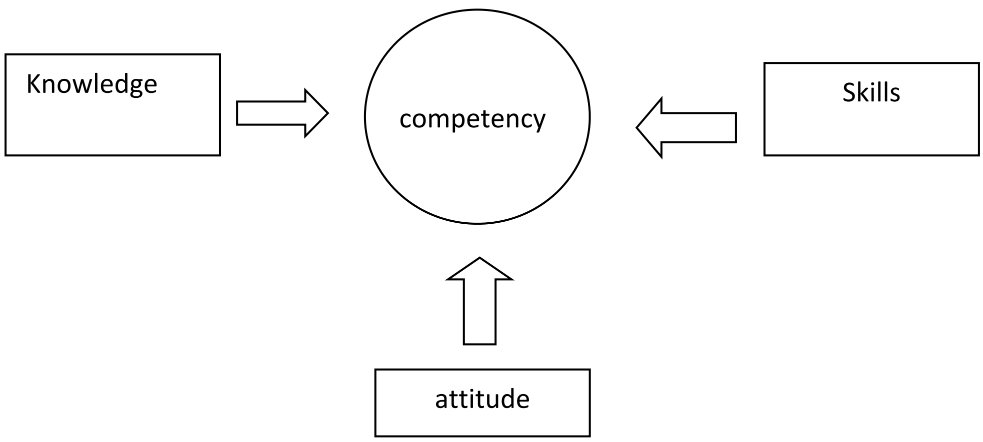
Phase 2: contains all the missions necessary to consolidate the knowledge learnt with solo flights and dual control checks.
Phase 3: contains the missions necessary to achieve the 50Km or 100Km distance flight in dual control and training programmes for further training courses.

In all the mission sheets reference is made to the theoretical content necessary to tackle the mission, as well as the TEM analysis involved together with the most common errors that can be expected from a student.

Acknowledgements

As I have been reflecting on the ideas and focal points, I have realised that the "teaching and learning" criteria, as well as the introduction of competences, have been the result of my professional experience at CAE Madrid. In particular, I would like to thank Jaime Ferrer, director of CAE Madrid, for what has possibly been the best course for instructors that I have been able to participate in. I would like to personally acknowledge the great benefit I have obtained from this course and thank him for the opportunity to have been able to participate in his classes and to be able to put his teachings into practice during my activity as a TKI instructor in CAE itself.
The contribution of fellow experts in the evaluation of EBT scenarios and ATPL training has been fundamental for a deeper understanding of the advantages and usefulness of competence criteria.
In this respect I must necessarily thank the invaluable help of Ignacio G. Alemany (EBT Iberia) who, in a totally disinterested way, has advised me on the most important directions in which to adjust the new "Competence" paradigm to the gliding sector.
I cannot forget the long talks with Anna Bonnati whose constructive criticism has helped me to refine day by day the construction of my idea of CBTA for gliding.
Special thanks to James, a great glider pilot and Marina Loteryman, whose helped me to correct in the limits of possible, the English redaction of this manual.
The number of people who have supported me in this project is so many, it would be impossible to mention them all, so I would like to thank them all for their patience and availability.

To understand this better, if we look at the accident statistics of the last 30 years, we can identify the phases of flight in which the most accidents/incidents have occurred, which shows the need for a change in the established criteria that do not meet the safety objective that we as aviators are seeking.
If we look at the regulations presented by EASA and specifically in AMC1 SFCL.130 SPL, it introduces the need to apply non-technical skills criteria in training, taking into account the risks associated with licences and activity. In fact, a distinction is made between knowledge, skills and, more particularly, attitude. This is not to say that this is not already done intuitively, but there is no doubt that standardisation will help to reduce the breadth of criteria applied so far.
If we look at what has been done in commercial aviation, we can deduce a number of concepts which are perfectly applicable to the gliding sector and which, despite the initial apparent difficulty, will ultimately simplify training and, more importantly, standardise it with all the advantages that this entails.
This new training concept has been developed by experts from all fields, from medicine, industry, etc. and more particularly in the aeronautical field under the umbrella of the IATA Training and Qualification Initiative (ITQI) since 2007. From a working group formed by airlines, academic institutions, aircraft manufacturers, international organisations, pilot associations and flight schools, an innovative philosophy has been developed, establishing a methodology for the development of training, assessment and recurrent training of pilots known as Evidence-based-training.
This methodology has been recognised by ICAO in 2013, which describes and publishes it in the document DOC 9995 "Manual of Evidence Based Training" which is accompanied by the document published in 2013 "evidence-based training Implementation guide" edited by IATA/ICAO/IFALPA.
Competency-based training (CBT) proposes a structured methodology for training and assessment based on precise and specific learning objectives.
This facilitates the learning process so that the learner acquires sufficient skills and knowledge to be able to perform to a specific standard under certain conditions. For the method to work, the expected standard must be clearly specified so that the learner knows at all times what is expected of him/her. On the basis of the above, it is essential that the trainer has a thorough understanding of the training programme and the learning objectives to be achieved in order for the trainee to reach the set level of competence. The aim is to increase the level of resilience of the pilot so that he/she has the ability to emerge stronger from an adverse situation so that he/she can minimise the effects of a negative situation and is resilient in the face of adversity, adapting to challenges with flexibility and positivity, evaluating the situation through reflection during the action, trusting in him/herself and managing his/her stress. To achieve competence, therefore, several factors must contribute:



Definitions

CBE Competency-Based-Education: is a result-oriented aviation training model in which core competencies are defined that establish the objectives to be achieved by the trainee and ensure the quality and consistency of the training. The core competencies and their corresponding indicators with observable elements have been defined in a standardised manner, which contributes to greater uniformity in training and assessment between the various centres.
CBTA: Competence Based Training and Assessment

Non-technical skills: non-technical skills identify part of the human factors involved in training and air operations as an integral part of pilot training. The introduction of these skills is of great help in focusing on operational aspects, contributing to greater safety and to a simplification and standardisation of assessment by transforming subjective criteria into the detection of previously established observable elements. These are social and personal skills that reinforce the way of executing the technical part.

As with anything new, the introduction of new concepts and criteria involves an effort which is not without its difficulties. As a rule, different people and entities are involved in the whole training process, each with their own thoughts, as follows:

Who	**What does he think**
Aviation professional	Vaguely intuits that CBE is focused on quality of training rather than on flight-hour learning
Institutional training programme designer	Understands that CBE is a learner-centred learning process tailored to meet the learner's learning needs and the precise role he/she will have to play during his/her professional life.
MPL instructors	Understand that CBE is an application of the MPL training programme.
NAA	They understand CBE as an evolution of the training system in which new teaching techniques are incorporated and which must be adapted to the context of each organisation while considering that many FIs may not understand how to modify their teaching style to the CBE model.
Instructors with practical experience in CBE	They describe it as scenario-based training in which the FI acts as a facilitator for the learner.
Recruitment & Selection	They understand competencies as a list of attributes that can be used to select the right candidate.

To some extent they are all right and at the same time they are all wrong or incomplete. In order to deepen understanding it is necessary to broaden certain concepts:
Competence: the ability to participate in a complex social activity for which one needs:
- Skills
- Knowledge
- Attitude

Competences: a series of written statements intended to describe the ability to actively participate in a social practice and which include:
- The nature of the competence
- A specific number of statements needed to describe the competence
- An appropriate language to describe the competence

Competence-based training: institutional design, training, assessment that systematically refers to the competences described.
Core competences: a set of behaviours expected on the basis of a given task describing the minimum acceptable level of effectiveness by including in its definition the competence title with its associated behavioural indicators.
EBT: training and assessment based on operational data characterised by an assessment of candidates across a range of core competencies rather than a measure of performance of individual manoeuvres or events.

the school or is a popular person within the organisation. This practice, which can be considered as a "natural" human influence, must be strongly opposed, as the student has the right to know his or her real performance in order to be more secure in the future. It is not honest to present a higher result than the one actually obtained, as this does not motivate the learner to take measures to solve the deficiencies and increase his or her capacity and competences.

- **Performance discrepancies**: we are human beings and we tend to underestimate a student's performance in areas where we are very good and overestimate the student's performance in areas where we feel we are weaker. To give an example, if as an FI we have just qualified as TMG pilots, with only 30 hours we will have some difficulty in correctly assessing the student's performance in powered flight management while we will be much more critical during unpowered flight.
- **Logic errors:** error derived from the association of a series of performances linked to other learning objectives: to give an example in the case of turns, if the student presents failures in the turn entry, but is able to perform an accentuated turn correctly, we will tend to evaluate the entry according to the best detected performance, forgetting the failures of the entry.
- **Limitation of criteria**: this is verified when the criteria are based on the performance of the students by relativising them to each other instead of being based on the standard established for the mission. If an instructor has two students, one poor and one very good, there will be a tendency to evaluate the poor one on the basis of the very good performance of the more advanced student rather than on the basis of the expected standard considered as NORM, in fact, lowering the mark of the less advanced one or evaluating the second one higher on the basis of the poor performance of the first one.

In any case, it is important that the instructor prepares the flight session in a timely manner by focusing on the focal points described in the mission and refreshing the expected and considered acceptable performance of the student to avoid, as far as possible, falling into the influences described above. The key word is honesty and objectivity, after all that is what we are here for.

<u>The TEM model is integrated into the CBTA evaluation.</u>

The instructor must apply TEM criteria continuously during the training process. This is of great importance as the PANS-TRG applies TEM to all types of pilots and all types of aviation activity. There is some confusion on this point to the extent that some organisations prefer to add a TEM module as a shortcut to achieve the desired objective, so that once the module has been delivered, this aspect is considered to be completed. Nothing could be further from the truth and the trainer should bear this in mind. By this I do not mean that it is not productive to teach a module dedicated to TEM, but it is absolutely essential that realistic scenarios are proposed in this sense, which an instructor must take into account in their resolution by the candidate in the evaluation of the fundamental competences involved in the mission. As explained above, the CBTA system includes all this part within its own philosophy. The integration of TEM therefore includes the education of students in the detection of threats and the application of countermeasures to maintain and achieve a high level of security. The application of the system using the core competencies and their respective indicators gives meaning to the assessment of TEM criteria within the evaluation. Let's look at an example: in the glider familiarisation exercise let's focus on the core competency of the application of procedures during overhaul:

Realistic applied scenario: it is proposed to perform the external overhaul of the aircraft. The class of law involved has been taught or is known and the theoretical integration indicated in the mission has been refreshed, however, the page in the aircraft manual describing the overhaul has been removed, although the chk-list has been maintained and a static and full pressure socket has been plugged or disconnected. The list of visual interception signals has been removed from the documentation. It is the third day of the trainee's training activity and this is when we decide to evaluate the described mission.

Performance of the trainee: he checks the aircraft following a standard procedure in a clockwise direction and considers the aeroplane airworthy and accepts it into service.

Competency	Competency description	Competency observable elements	1	2	3	4
Application of procedures	Identifies and applies procedures following operational instructions and applicable legislation using appropriate knowledge	Identifies the source of operational instructions				
		Follow SOP unless a higher degree of safety suggests a deviation.				
		Identifies and follows all operational instructions in a timely manner				
		Operate the aircraft systems and associated equipment in the correct manner				
		compliant with rules				
		Applies knowledge of relevant procedures				

It is left as an exercise to complete the table as each trainer can assess the trainee's performance according to his or her own criteria, however, it is clear how, whatever the personal criteria of the trainer, the assessment through the competence indicators in this case will yield the same insufficient result and the trainer will have to deepen and facilitate the trainee's TEM analysis. Note how in the traditional system and at the level of training records, this mission, which is the first one, would have already been marked as accomplished and probably passed, however, on the third day of activity, it would not be unusual for certain deficiencies to remain undetected.
In this case, the analysis would be facilitated by proposing questions during the class or long briefing of the flight session of the type:

What if?	Consequential undesirable state	barrier
There is no manual.	No complete revision	Use Chk list of mandatory documentation
No full check is done	Disconnection of controls possible etc...	Use full Chk list from glider manual revision
…………	……………………………..	………………………………..

The system works even in the case that the mission has been marked as accomplished and passed before and we are facing any subsequent mission since the presented assumption of an erroneous check is applicable to any other flight mission and a deficient application of procedures would still appear despite the fact that the learning objective of the mission may be met and the expected standard in terms of handling would be achieved.

<u>CRM elements involved in training</u>

Because of the greater simplicity of the gliding discipline, we will be able to introduce a number of competencies that are common to all the proposed exercises in the training programme and that will continue to affect the flights thereafter. This should be borne in mind as instructors will need to carry out refresher flights with the pilots. The competencies that can be taken into account and which, in my opinion, are in line with the activity are the following:
- Application of procedures
- Problem solving
- Self-control
- Decision making
- Communication
- Situational awareness
- Flight management

- Aircraft handling.

We can observe that if a pilot performs all the actions described above, he/she fulfils his/her piloting skill and also demonstrates a series of attitudes and complete knowledge, thus demonstrating a high level of "Airmanship".

In the EASA documentation, competencies are codified and each competency is associated with observable elements defined as non-technical skills, which are divided into two main groups:

NTKS1 which defines criteria for flight management, co-operation, decision making.

NTKS2 which refers to application of procedures, communications, aircraft handling, self-control, problem solving and situational awareness.

The non-technical skills are in turn supported by a number of CRM elements that affect them and are also defined.

Let us look at the CRM elements involved in training and which must be taken into account in the preparation of a flight mission and in pilot training in general:

General CRM factors

a. Human capacity and its limitations

b. Human factors

c. TEM

b) Personal CRM

a. Self-awareness, personality, attitude, self-criticism

b. Stress management

c. Fatigue/vigilance

d. Assertiveness, situational awareness, information acquisition and process

c) CRM general flying

a. Familiarity with flight support equipment and its operation

b. Recognises the differences between types of aircraft

c. Monitors and intervenes

d) CRM phases of flight

a. Shares situational awareness

b. Manages workload

c. Communicates effectively

d. Is resilient

e. Manages surprise and starlet effect

f. Recognises cultural differences

e) CRM operations

a. Application of established security culture

b. Effective communication and knowledge of the communication process (occurrence reporting etc.).

The great workhorse in aviation, which is the influence of the human factor, is answered with this system. It is a fact that accidents due to mechanical failures have been reduced to very few cases, with most of the root causes being attributable to the human element. This is why this methodology is of vital importance, especially in our field.

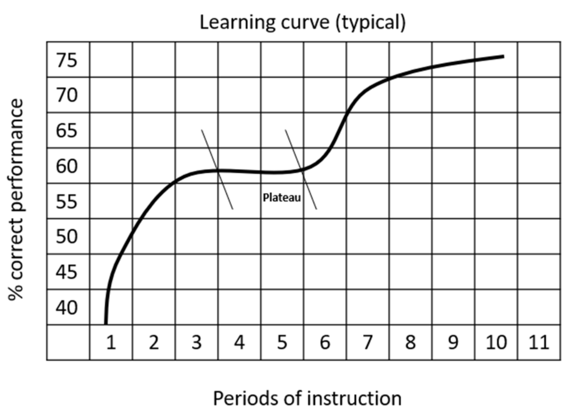
<u>The criterion of competences applied to the theoretical part</u>

It is almost natural to apply proficiency criteria to missions and flying sessions, it does not seem so obvious at the theoretical teaching stage. This has a number of implications since a lesson cannot simply be a lecture of knowledge, but has to be directed towards facilitating the learning of the proposed objectives and the interconnections with the other subjects together with a careful TEM analysis involved. We will see later on in the teaching and learning part what the applicable guidelines should be that allow the application of the suggested methodology. For the time being, we must remember to integrate in the

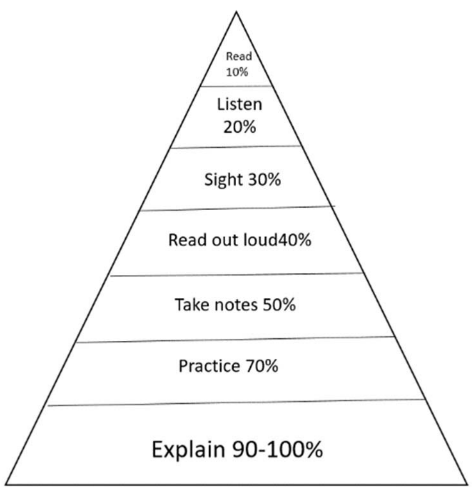
Learning levels

All learners, regardless of their level, will always move from a novice level to an expert level, in the sense that they have experienced and understood the learning objectives foreseen for the class/session. Once the learning objective has been properly defined, how should it be presented/proposed?
The first thing is to present and teach behavioural patterns, the truth that we learn by imitation (which must always be taken into account), patterns that we try to reproduce by contributing our personal knowledge and ideas: trial and error.
Once the objective has been presented, as instructors we will allow the learner to rehearse the pattern and practice what has been learned. Let us remember as instructors that there are often equally valid solutions other than our own.
The learner's performance must be monitored at all times, what has been learnt must be checked to ensure that it is within the expected result and feedback must be given. This will require continuous monitoring to identify the necessary and sufficient information to facilitate the achievement of the learning objectives set.
For this it is important that the information is identifiable within the domain using facilitation techniques. Basically, we have a first cognitive level during which the instructor teaches and a second phase during which the learner reproduces the teaching by association until automaticity with the practice is achieved. To do this, the instructor must first demonstrate what he wants to teach and then allow the student to practice and experiment, allowing him to identify errors on his own and correcting them when necessary until he reaches the desired automaticity within the learning objective.
So, if what we want is to achieve a high degree of motivation on the part of the learner, we must set specific, achievable, identifiable, realistic objectives within a reasonable timeframe.
We are talking about SMART objectives:

1) Specific
2) Measurable
3) Achievable
4) Realistic
5) Achievable within a reasonable time



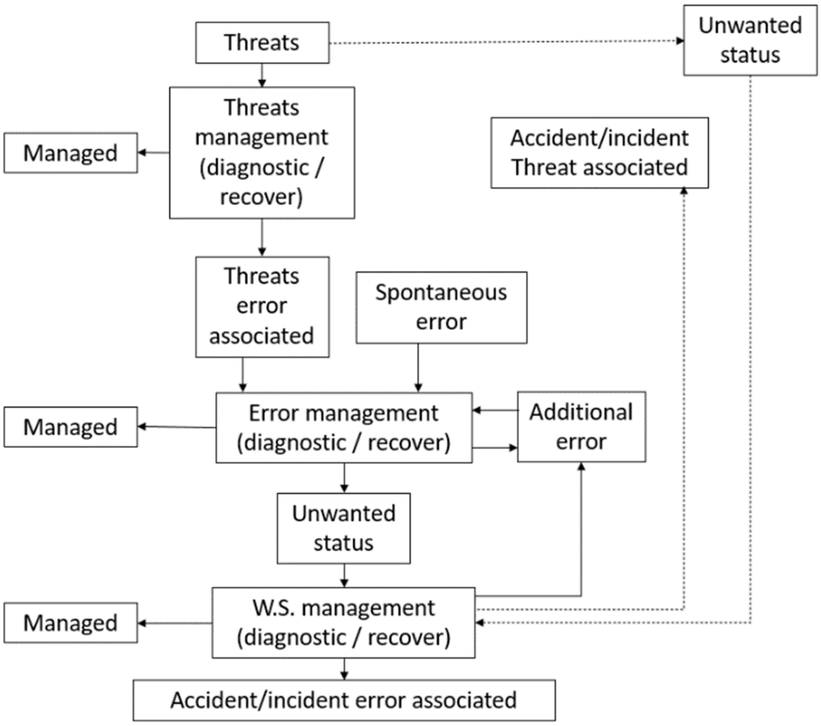
Considering the time we have available during a flying session it will be appropriate to design the objectives to meet the SMART definitions so that a series of stepping stones can be constructed for a maximum of 4 specific objectives as a series of steps to follow in order to achieve the objective of the session.
Despite the efforts of motivation and facilitation, we will always find, and it would be unusual if this were not the case, events and factors that will condition the ideal progression of a student. Particularly in our field, it is usual that the classes/sessions have not been planned in a calendar, being in a certain way "on demand" as the student's attendance is conditioned by factors exogenous to the programme itself, in addition to weather conditions, availability of resources, equipment breakdowns, etc. From the above it is best to make it clear that it is not possible to predict a learner's progress and it is important that the learner is aware of this in order not to lose motivation. However, even if we have the ideal conditions in which a learning curve is continuous, learners may in themselves start with a rapid progression which at a certain point will eventually stagnate or even degrade to lower levels for a period until the level of progression is

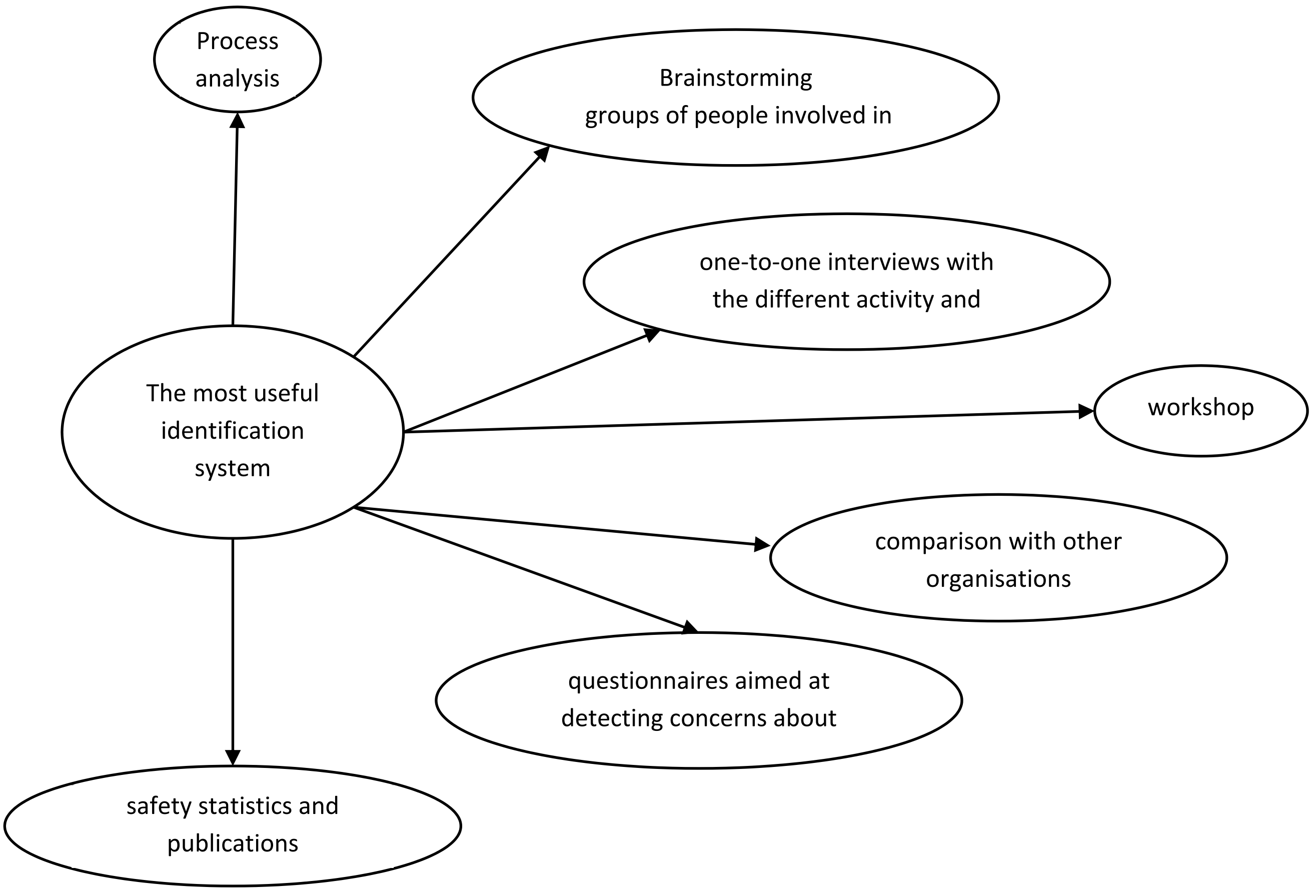


Processes and procedures

a) Declarations and training programs
b) Human factors
c) Maintenance
d) Platform operations
e) In-flight operations
f) Other remote aerodromes in use
g) Emergency response

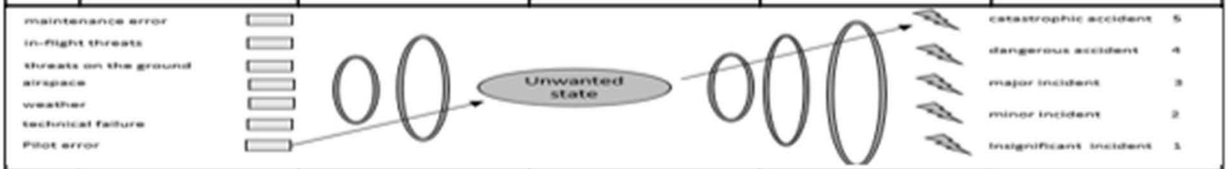
The main thing is to identify the threats and dangers, so it will be necessary to build a specific scenario for each of the above based on data that may have been collected by publications, statistics, own experience, management history, etc. A path for the detection of threats and dangers is proposed below:





At the end of the analysis, we will have the following sheet completed and which must be part of the instructor's background knowledge:

V1	SIRA evaluation sheet				
1	title	accident due to erroneous pre-flight checks			
2	definition of the scenery	preparation for flight with wrong control configurations (flaps, cockpit closing, lever position before take-off, free objects in the cockpit and eventual blockages or limitations of the controls)			
	description of the hazard	loss of aircraft control			
	description of the scenario	lack of attention during checks due to haste or lack of experience of the pilot in command.			
	aircraft type	Glider K 13			
	location	LESS			
	study period	Last 15 years			
	other	uncontrolled airfield			
3	analysis of the potential scenario				
	Triggering event		Unwanted state		Accident consequences
	due to distraction and haste, checks are not carried out correctly.		loss of aircraft control, cabin breakage		from cockpit rupture to inability to control the aircraft



4	Barrier description	preventing the situation		That recovers the situation	
		training, carrying out checklists		Immediate cable release and take-off abort	
5	Risk assessment				
	indicates the estimated frequency with which an event occurs.	the frequency with which barriers fail is given	frequency with which the event occurs	the frequency with which the barriers fail to resolve the problem is given	frequency with which the accident occurs
	0,002	0,1	0,0002	1	0,0002
	Event severity	5	Associated frequency assessment		2
6	mitigation	use experience barometer and set double controls for red arc. In school gliders set up checklists which must be read before take-off, the wingman verifies the correct configuration of the glider before take-off, and the wingman verifies the correct configuration of the glider before take-off.			
7	Risk assessment after mitigation				
	indicates the estimated frequency with which an event occurs.	the frequency with which barriers fail is given	frequency with which the event occurs	the frequency with which the barriers fail to resolve the problem is given	frequency with which the accident occurs
	0,001	0,001	0,000001	0,00001	1E -11
	Event severity	3	Associated frequency assessment		1
Final calculation					

8	Event risk	Before mitigation	After mitigation	**note:** as always, haste is the cause of accidents. The mandatory checklist will reduce the possibility of aircraft misconfiguration. The wing attendant can easily check if the cockpit is closed and locked before releasing the aircraft for launch. Briefing remembering checklists are beneficial.
	Probability	2	1	
		x	x	
	severity	5	3	
		+	+	
	Exposure correction	-3	-3	

The instructor must always keep in mind and master the basic concepts of the TEM and apply them during his performance and that should not be limited to the exclusivity of flight operations, but must be extended to all the activities described above. At teaching levels, the instructor must always keep in mind the CRM elements during the student's training and must identify, as far as possible, the necessary ones that must be trained or exposed, integrating them within the classes/sessions. The presentation of real scenarios and their evaluation through CRM and TEM concepts are an essential tool for a high quality of training. In addition, the analysis must extend to the teaching

- How many flights before flying alone? Relating it to age, the learning speed can be deduced.
- Since when do you not perform specific exercises? Like stalls, spins, simulated emergencies
- Do you know the glider in which you have to fly? If not, carry out a specific briefing before the flight and demand accommodation time on the ground.
- Does the student have long solo flights? It is an index of good learning ability
- Reading the flight book together with the appropriate questions and answers is a vital means of getting to know a student or pilot meeting for the first time.

How to write in the flight book

- The comments must be written as if another instructor had to read them, so it should not be the summary of the flight made. The written comments will be useful for the instructor who will carry out the following flights with the student and will serve to evaluate the capacities and direct the teaching in the best way. The instructor will subdivide the comments into three parts:
- • What the student has done correctly (e.g., keeping up the speed)
- • What represents a problem (e.g., You should look further outside)
- • What you need for the next flight (e.g., try landing pattern without suggestions)
- This last element is clearly directed to the next instructor and will save him an entire flight just to understand what has already been checked by the previous one, with the consequent benefit in time and money for the student.

RISK SCENARIOS AND THEIR IMPLICATIONS IN TRAINING

As we have seen, the training is aimed at ensuring that the future pilot is able to safely face any unknown situation and not as a simple replicator of actions based on previously seen scenarios. However, there are a number of accidents/incidents that suggest further study and analysis of the scenarios due to their implications in the event of accidents/incidents.

Launch operations

Winch

After analyzing the accidents that have occurred, it is evident that the main cause of accidents is stall during the early launch phases between 0 and 100 meters and the following entry into autorotation. According to BGA data between 1974 and 2005 in the UK there have been 36 fatal accidents, 72 serious injuries and 278 destroyed gliders in the same period. After a deeper study of the launch mechanics and applying a series of corrective measures and barriers in the following 12 years, the accident rate has been drastically reduced to 7 with deaths, serious injuries and destruction of the glider. UK leaves the statistic in a serious accident every 80,000 launches, leaving it from 36 to 3 in the same period of time, far from the Spanish statistic.

IMPORTANT NOTE TO THE WINCH OPERATOR

If the acceleration is excessive, an anticipated rotation is obtained, so the lathe operator must:

1. Know the necessary power set for each sailboat
2. Continuously monitor rotation
3. Bring the stick to the maximum allowed for each sailboat in a minimum of 2/3 seconds and 3 or 4 seconds in the case of synthetic cable and very powerful winches.

Root cause analysis:

- Wing drop during the rolling phase and consequent wheelie
- Stall during rotation followed by flick roll and inverted flight
- Loss of power between 0 and 50 meters and dive towards the ground
- Loss of power mid-launch followed by stall and next spin
- Mid-rise power loss, stall recovery and off-field shot with collision with terrain obstacles
- Collision with the towing cable on the ground or in flight

Wing drop during take off

- If the wing touches the ground while rolling in the acceleration phase, it is more than likely that an uncontrollable yaw axis rotation will be generated with the use of the pedal. Once the yaw has started and despite the release of the cable, it is very likely that the situation will not be recoverable. For all these reasons, it is imperative to anticipate the event by releasing the cable before the wing reaches the ground. Trying to recover this fall is very risky, so it is convenient to immediately abort the takeoff by pulling the barycentric hook opening actuator.
- The causes for which the wing may have a tendency to fall during the start of takeoff can be varied, although we can summarize them in the following:
    - Wind not aligned from the direction of the launch.
    - Sailboat not aligned with the direction of the cable on land
    - The wing assist induces a rotation by retaining the wing during the roll phase
    - Launch with a tailwind component

Root cause	barrier	Undesired state	Mitigation
non-aligned wind	The wing assistant checks pressure on the wing and does not launch until it is balanced. The assistant is the one who determines the moment of launch and NOT the pilot. look ahead to check glider levelness	Wing too close to or touching the ground	Immediate release before going airborne. Pilot hand near the release actuator
Glider not aligned with the cable	The wing assistant checks for perfect alignment with the winch before hooking up. look ahead to check glider levelness	Yaw and downwash effect of the wing opposite to the throw	Immediate release before going airborne pilot hand near the release actuator
Wing assistant induces rotation	The assistant will hold the wing from the trailing edge without using the thumb, not chase the wing or push it, but simply let it go. Thorough training of the assistants	Wing yaw and downwash effect	Immediate release before going airborne Pilot hand near release actuator
TAILWIND LAUNCH	CANNOT BE LAUNCHED	CANNOT BE LAUNCHED	CANNOT BE LAUNCHED

The pilot must be aware that it is better to let go than to try to recover from a life-threatening situation. If you cannot keep the wings level, **RELEASE IMMEDIATELY**.

Rotation

The accidents that occurred can be identified in the following two large groups:

1. Stall during rotation followed by wing drop, flick roll and inverted position
2. Loss of power between 0 and 50 m followed by deep stall or pitting and collision with the ground.

They are very rare accidents, but absolutely fatal. During the transition from level flight to the correct climb attitude (45º) the wing must generate enough lift to increase the vertical speed from 0 to 75 km/h or 80 km/h (depending on the type of glider and its manual specifications). A stall in this case will occur due to a dynamic effect or a loss due to "Gs" so that as soon as there is a minimum yaw, an autorotation (flick roll) will develop. Often in these cases the glider ends up inverted on impact with the ground and the cable still connected. It is important to remember that once this process has started, the situation is irrecoverable, so we can only provide barriers to avoid the unwanted state by working on prevention. This class of losses is verified by a low speed combined with a high speed of rotation. If a sailboat has a stall at 1g of 65 km/h if the rate of rotation is 20º/sec. the increase in Gs will bring this stall speed to approximately 90 km/h, if the rate of rotation is 15º/sec. The stall speed rises to 81 km/h.

The root cause therefore seems to be **TOO FAST ROTATION**

Root cause	barrier	Undesired state	Mitigation
Too fast rotation	• BE well accommodated so as not to slip backwards by pulling the lever. • RESIST the temptation to pull the lever too soon to go airborne and immediately adopt the climbing attitude (Christ). • RESIST the temptation to go airborne too soon to avoid the bumps. • MAINTAIN A LOW ROTATION ATTITUDE until a speed of 1.5 Vs is achieved and there is still a feeling of acceleration. • If the sailplane rests on the nose wheel stick to centre, if the sailplane rests on the tailwheel stick forward. If the winch hook is well below the centre of pressure stick forward. • Keep the speed under control and if the speed is reduced, lower the nose by slowing down the rotation speed. • In case of flap maintain the position recommended by the manual until the end of the launch. • Apply natural rotation concept	Stall and flick roll	No mitigation possible. The accident is sure

PHASE 1

Nº mission	000	Familiarisation with glider and airfield environment	ground

OBJECT

A	The operation area
B	Locate the necessary equipment
C	Ground manoeuvres and glider rig & derig
D	Base communications

Theoretical basis and required knowledge

AFM
Aerodrome VFR chart

DEVELOPMENT

This is an introductory class that can be given as a group. Its purpose is to introduce the student to the new aerodrome environment, which may be totally unfamiliar to him/her. This is the right moment to lay the foundations of the discipline of the centre, especially with regard to the development of take-off and landing operations, and the care and cleaning of the equipment and gliders.

The aim of this lesson is to teach the student: how to move safely around the aerodrome, how to handle gliders and vehicles on the ground, where to find all the materials necessary for the operations: parachutes, cables, etc., what kind of commitment is required during the flight operations, to attach cables, lay them, recover gliders, refill the chrono, etc., what are the specific structures of the centre, how to take care of the material at the end of the day's operations. Assembly and disassembly of the glider.

Learning objective: to interpret the glider manual, to identify the controls and equipment, to sit correctly in the glider, to move around the airfield safely, to participate actively in operations, to handle the glider on the ground, to fill in a chrono correctly. To rig and derig the glider.

Briefing-long Briefing: The instructor will proceed to illustrate how a landing circuit is developed in a synthetic way by demonstrating how aircraft approach the runway in an orderly manner and following a procedure, the emphasis will be greater if the student could listen to the actual radio communications and the standard phraseology used. Special emphasis will be given to indicating the areas of greatest danger. The glider manual shall be presented and all peculiarities, systems and equipment shall be illustrated. The structures of the centre and the stores where the material necessary for the operation can be retrieved will be presented. Describe the movement of the glider on the ground and its dangers, especially inside the hangars and during the towing with car to the take-off point according to space, wind and obstacles.

The use of the glider manual for the rigging and derigging of the glider, the peculiarities of the various control connections (special emphasis on the hoteliers). How to derig a glider (preferably a single-seater) and how to rig it.

Care should be taken not to teach the student too many concepts at once. This is an introductory class and all that is presented in this class is what is customary on a normal operational day.

KSA application: Real scenarios should be presented. A distraction element will be introduced to check if the student is able to maintain situational awareness. The trainee will be asked about the traffic around him/her. A distractive element will be introduced during rigging and derigging.

Expected standard (Normal): Retrieves the necessary information from the glider manual, identifies the main parts of the glider, fills in the chrono register without errors, is able to move the glider on the ground correctly, recognises the traffic in flight, participates actively in the operation. Participates with discipline in the assembly and disassembly of the glider.

Competencies and observable elements:

Competence	Description	Behavioural indicator
Application of procedure	Identifies and applies procedures in accordance with published operating instructions and applicable regulations using the appropriate	• Identifies the source of operating instructions • Follows SOP's unless higher safety lets a deviation • Applies relevant procedural knowledge • Complies with applicable regulations
communication	Demonstrates effective oral, non-verbal and written communication, in normal, non-normal situations	• Selects appropriately what, when how and whom • Listen actively and demonstrate understanding • Accurately reads and interpreted documentation • convey messages clearly

Self-control work load management	Manage resources effectively to prioritize and perform tasks in the expected manner and times	• Maintains self-control in all situations • Manage time efficiently • Manage and recovers from interruptions
Decision making	Uses the appropriate decision-making process by risk assessment and prioritize	• Seeks accurate and adequate information • Identifies what and why tings gone wrong • Set priorities appropriately
Problem solving	Accurately identifies problems and risks	• Identifies and consider options effectively • Employ proper problem-solving strategies • Improvises when faced with unforeseeable situation
Situation awareness	Perceive and comprehends all the relevant information available and anticipates what could happen that may affect the operation	• Identifies and assess accurately the aircraft state • Anticipates accurately what could happen • Identified and manage threats to the safety • Recognize and responds at reduced S.A.
Flight Path Management	Plan, monitor, maintain the necessary flight parameters	• n/a
Aircraft control	Control the aircraft flight path, including appropriate use of control	• n/a

TEM analysis:

Possible scenarios

- The most common incidents in the field are related to the ground movement of gliders: taking them out of the hangar, moving them on the apron, etc.
- Runway incursions by trainees without checking for possible landings in progress
- Failure to carry out the connected cable test before take off
- Incomplete assembly

Threats

- Collisions inside the hangar and during towing movement on the ground
- Movement on the ground and in the air of other aircraft
- Inadvertent cable release
- Controls not or incorrectly connected

Hazards

- Deformation and breakage of the glider structure
- Collisions with other aircraft; running over students
- Loss of aircraft control

Barriers:

Expert pilot directs ground operations. Application of proper look-out; instructor control, during ground transfer one student will be assigned to stand on the nose of the glider to brake and/or open the tow hook if necessary and a second on the wing tip with briefing on the transfer performed. Assembly and disassembly following a chk list and glider manual.

Mitigation: Instructor interrupts action and repeats briefing.

Common errors

The only difficulty students may have in this lesson is simply remembering everything. The instructor should be aware that he/she will have thousands of opportunities to illustrate these basic concepts (in practice every flying day). In any case, standard circuit diagrams of the airfield will be distributed during the first lesson. During the transfer to the runway the student holding the wing will have difficulty steering the glider and in the case of braking will pull the wing with the consequent yaw. A student unaccustomed to a flying field does not notice the key positions in the sky and therefore his situational awareness as well as the application of procedures is often very low at the beginning of the course. Erroneous interpretation of what is asked of them during assembly and disassembly, forcing connections.