Didactical Aspects

of

Flight Instruction

in

Sailplanes

Dr Martin W Smit

2023-V5

Introduction

My first glider flight was when I was 17 years old. I wanted to be a professional pilot but ended up being an architect. However, gliding always remained part of my life. Due to family and moving abroad I took a break from gliding twice.

At 21 I became an instructor and discovered that I liked to teach. Moreover, that teaching is rather complex. Every student is different, and I thought a lot about how to teach, be it gliding or architecture. In the end it is the same, it's about supplying the tools to people for developing themselves.

Two years ago, I decided to return to instructing. One of the exams is on the didactical aspects of teaching gliding. In preparation for the exam, I wrote this presentation. My intent was to teach myself the subject (I learn the most by teaching a subject). Much of it based on my experience as a glider instructor (about 2600 flight and 390 hour of instructing).

It received a lot of positive and encouraging reactions from new and more experienced instructors as well. As a follow-up I wrote a presentation with a number of exercises. Any feedback trying these exercises will be appreciated.

Martin W Smit

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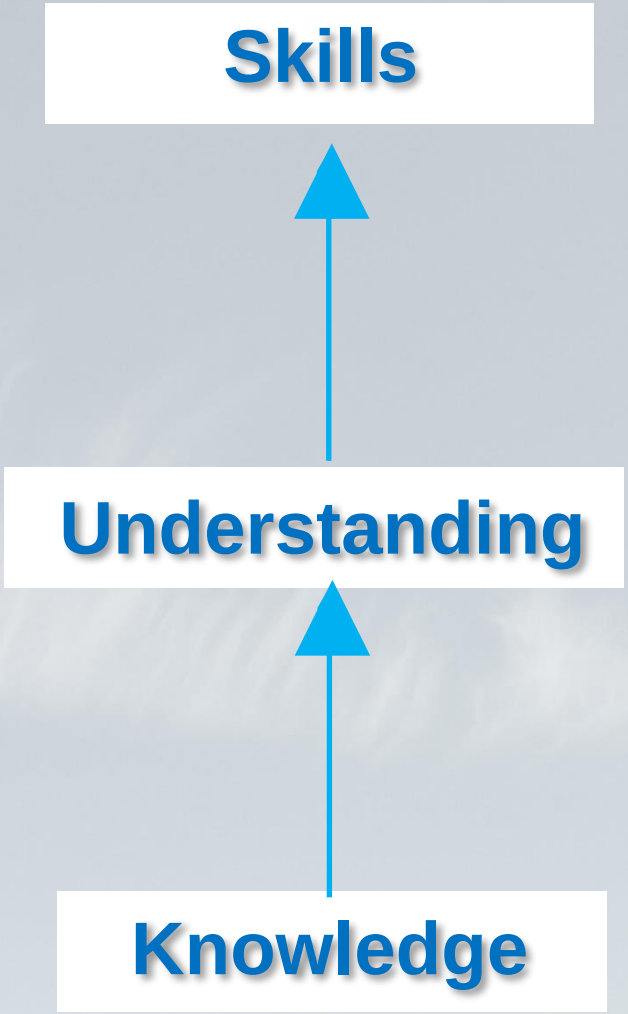
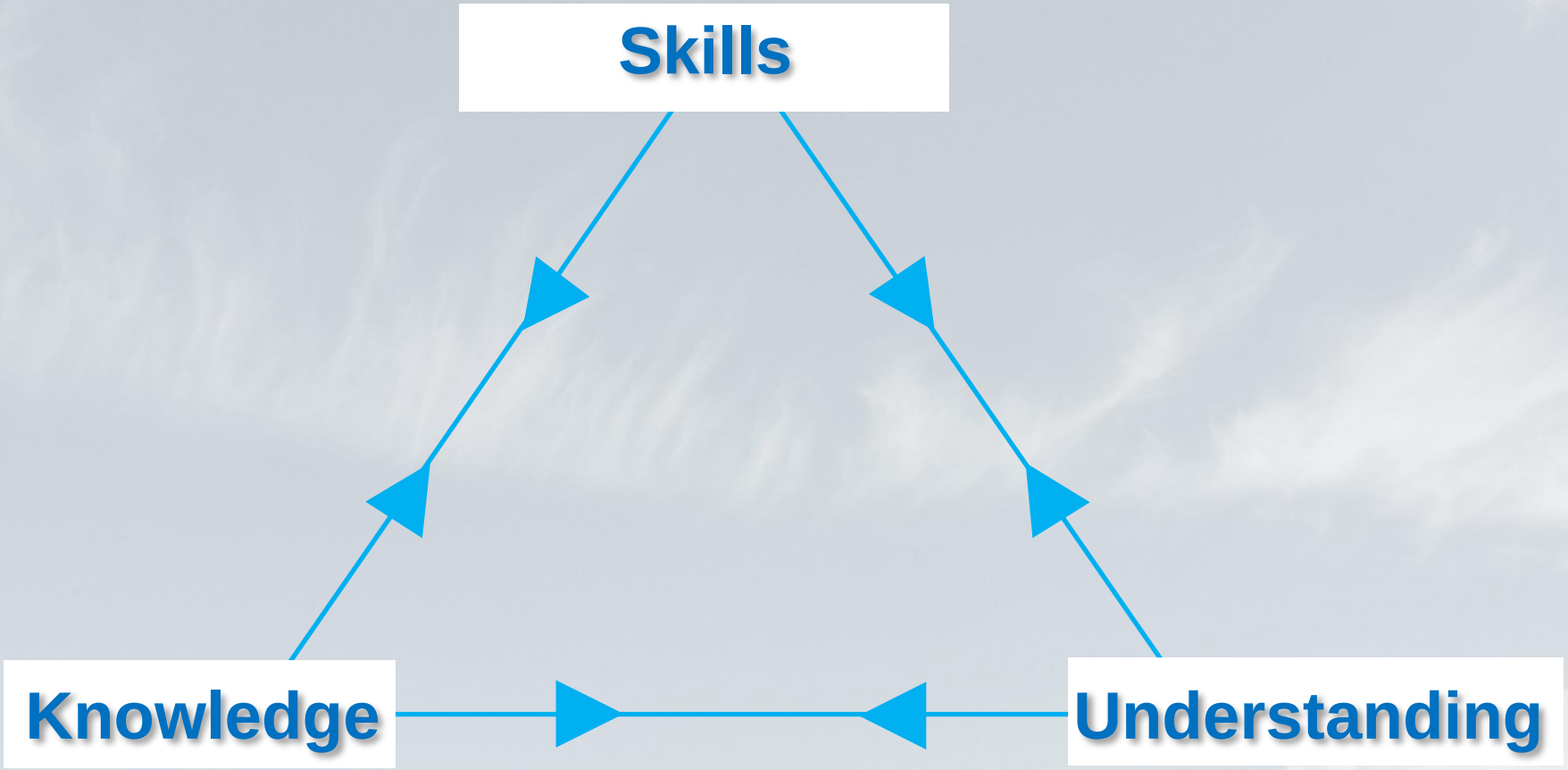
1

What it takes to be a Glider Pilot


Skills
Understanding
Knowledge

Cyclical Interaction



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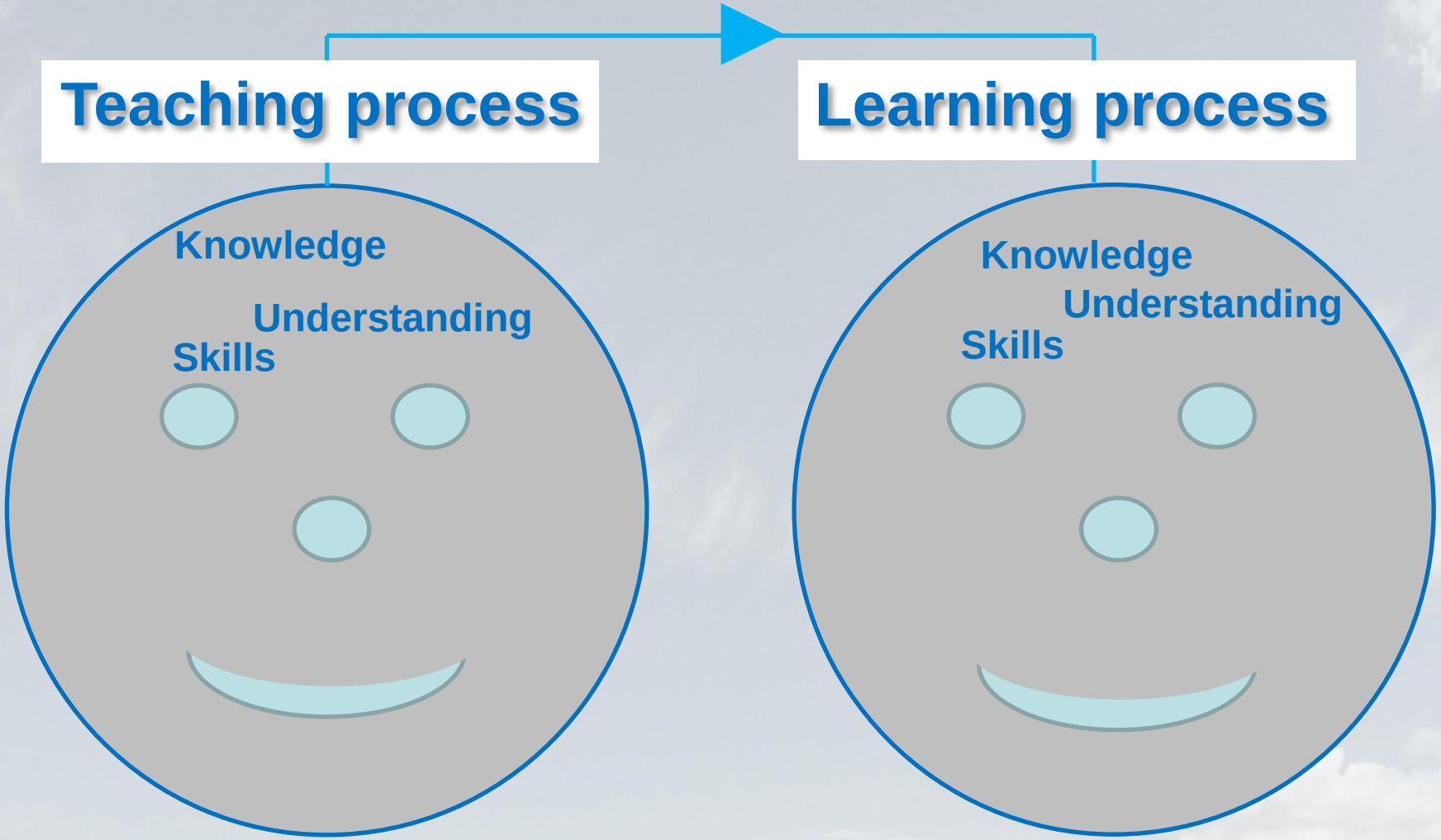
Learning process and Teaching process

At the beginning of the training

Instructor

Student

Transfer process



Students and their Learning style

Think they know everything, remarks are unnecessary

Think they still don't know and want every aspect to be explained and/or demonstrated again and again

Want to have a complete understanding and acts only then

Want to do it immediately and on the way to learn how to do it right

Are busy with everything at the same time without doing even one thing right

Concentrate on one aspect but "forgets" all the other aspects

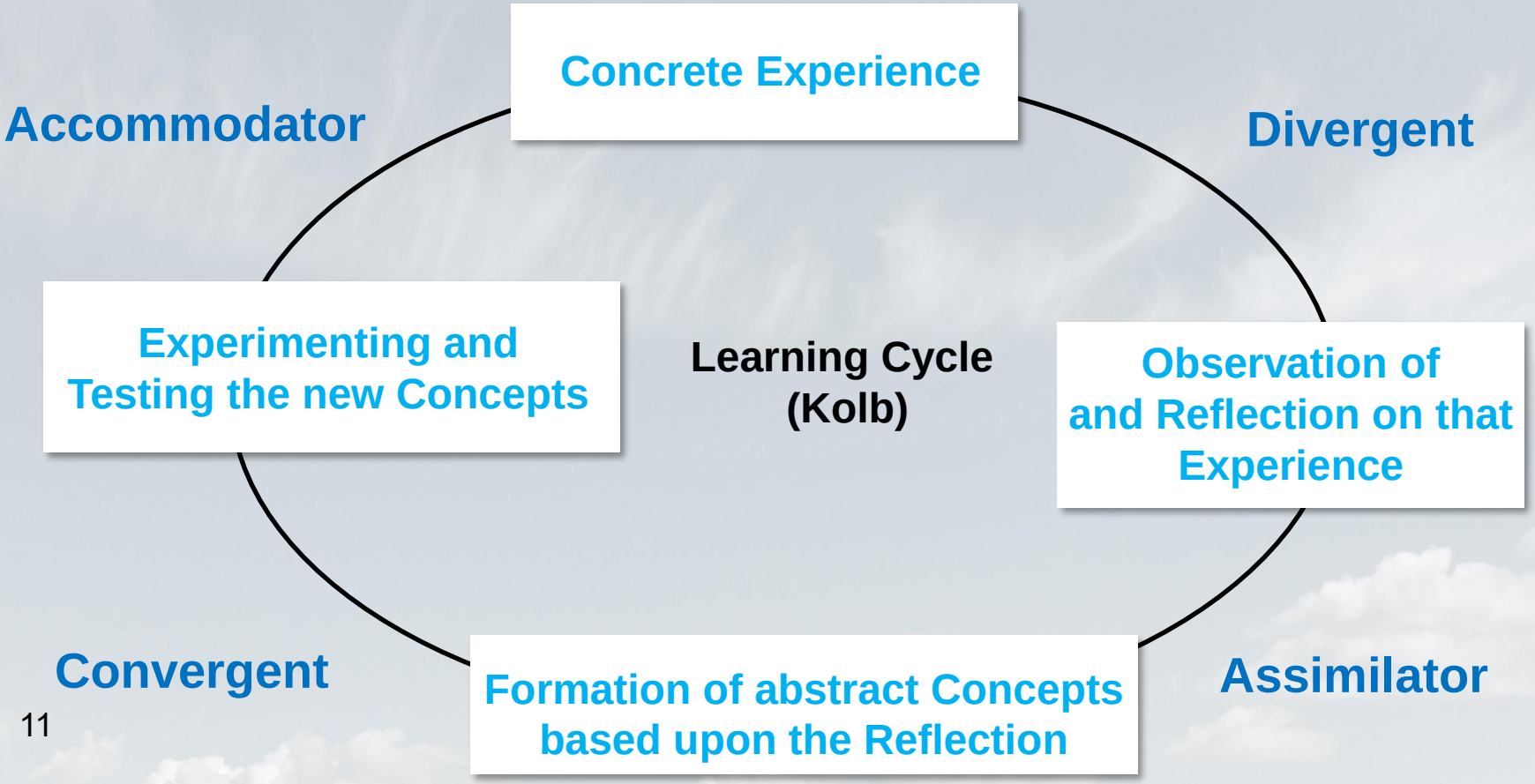
Every Student

Experiences, Observes, Reflects, Conceptualizes, Experiments and Tests

(But to varying degrees)

Every student has their own "Point of Entrance"

Goes through all phases of the **Learning Cycle**



Instructors and their Teaching Styles

Explain everything over and over

Correct every (even small) errorof the student

Let the student mess around

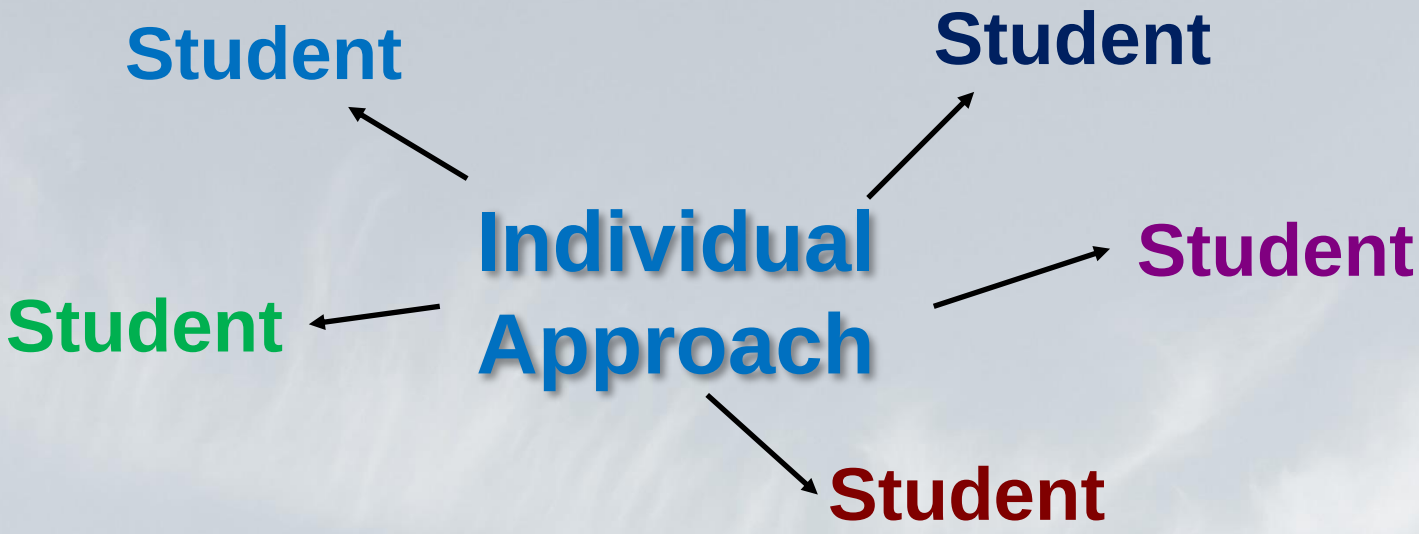
Discuss after the flight extensively all points of improvement

Give compliments on everything

Fly themselves most of the flight (aware or unaware)

Student can do nothing right

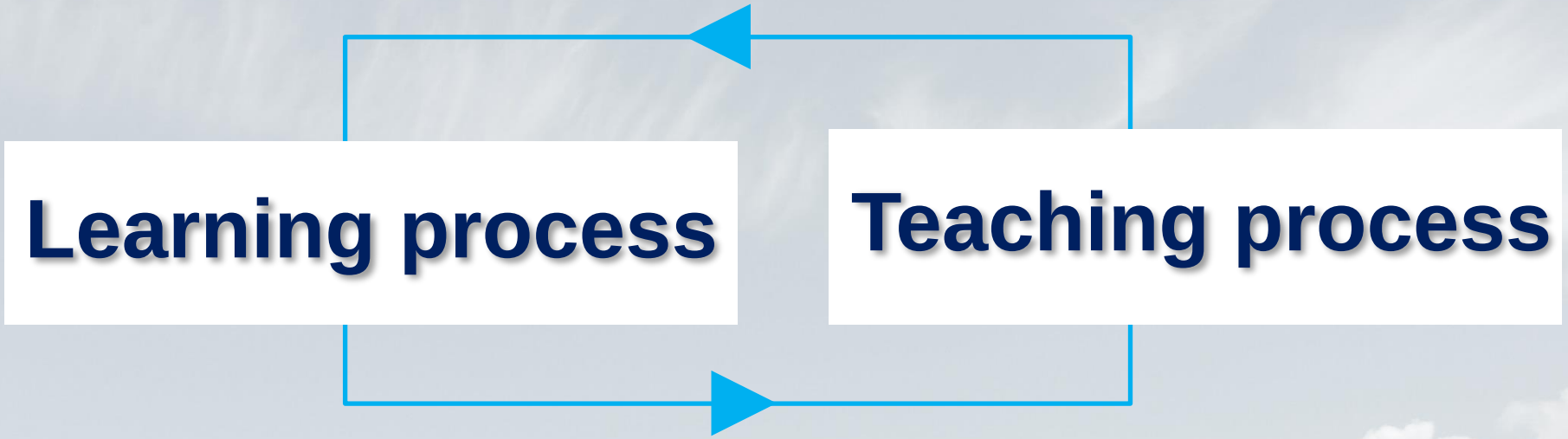
Teaching Style for the instructor



Every student has their own “Point of Entrance”

Cyclical Interaction

Learning and Teaching happen simultaneously and are inextricably linked



Reflection

Experience

Process

Applying it

Reflection

Is the engine of the Learning process

Student: Looking in the Mirror

Instructor: Holding up the Mirror

3

On the Complexity of Gliding

Even a relatively simple exercise has great Complexity

There is an abundance of moments of

Decision **Reflection** **Information**

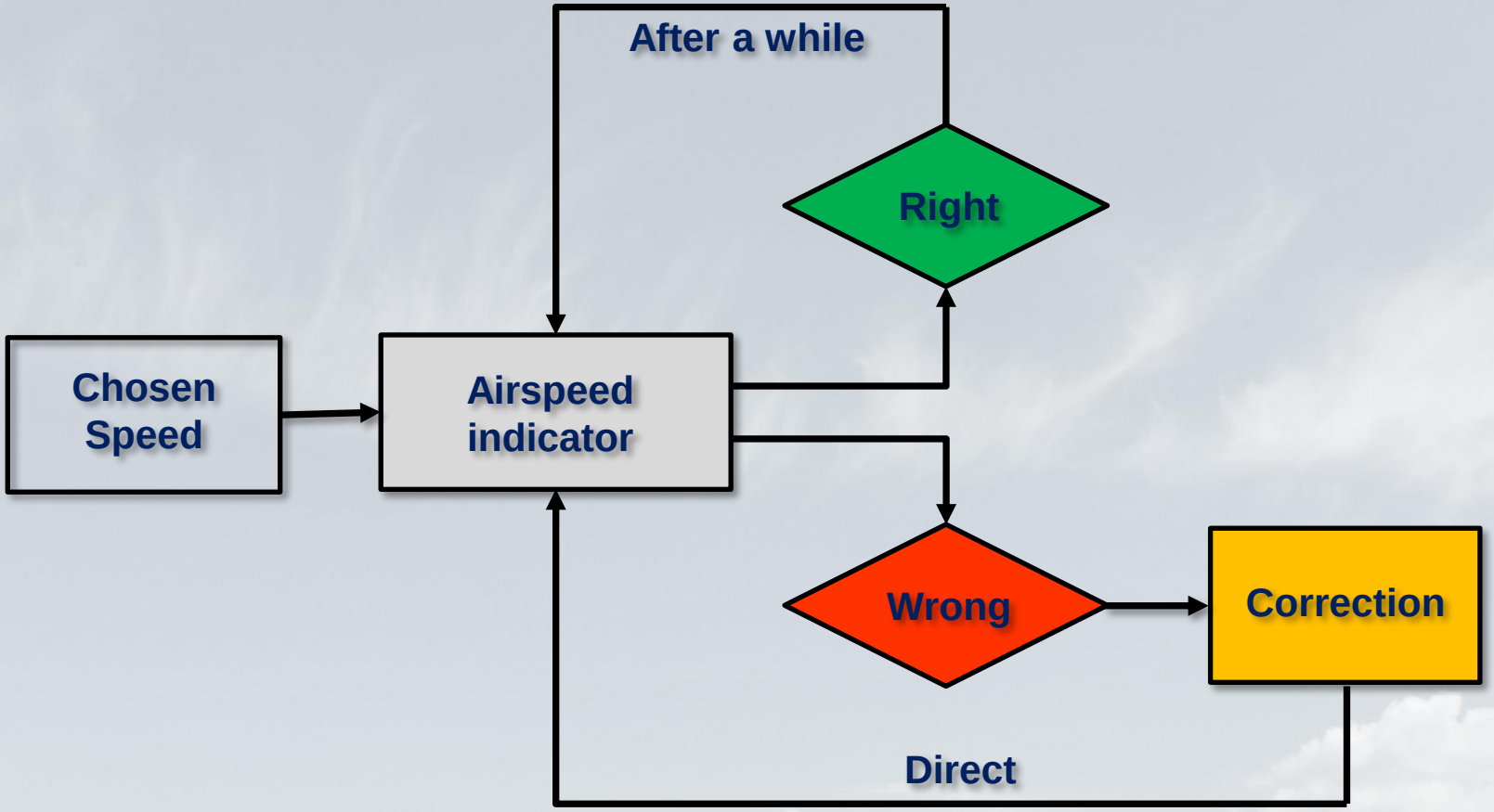
Example:

Maintaining a certain Speed

The example is not meant to be an exercise on how to teach flying at a certain speed, its only purpose is to show the complexity of a relatively simple exercise

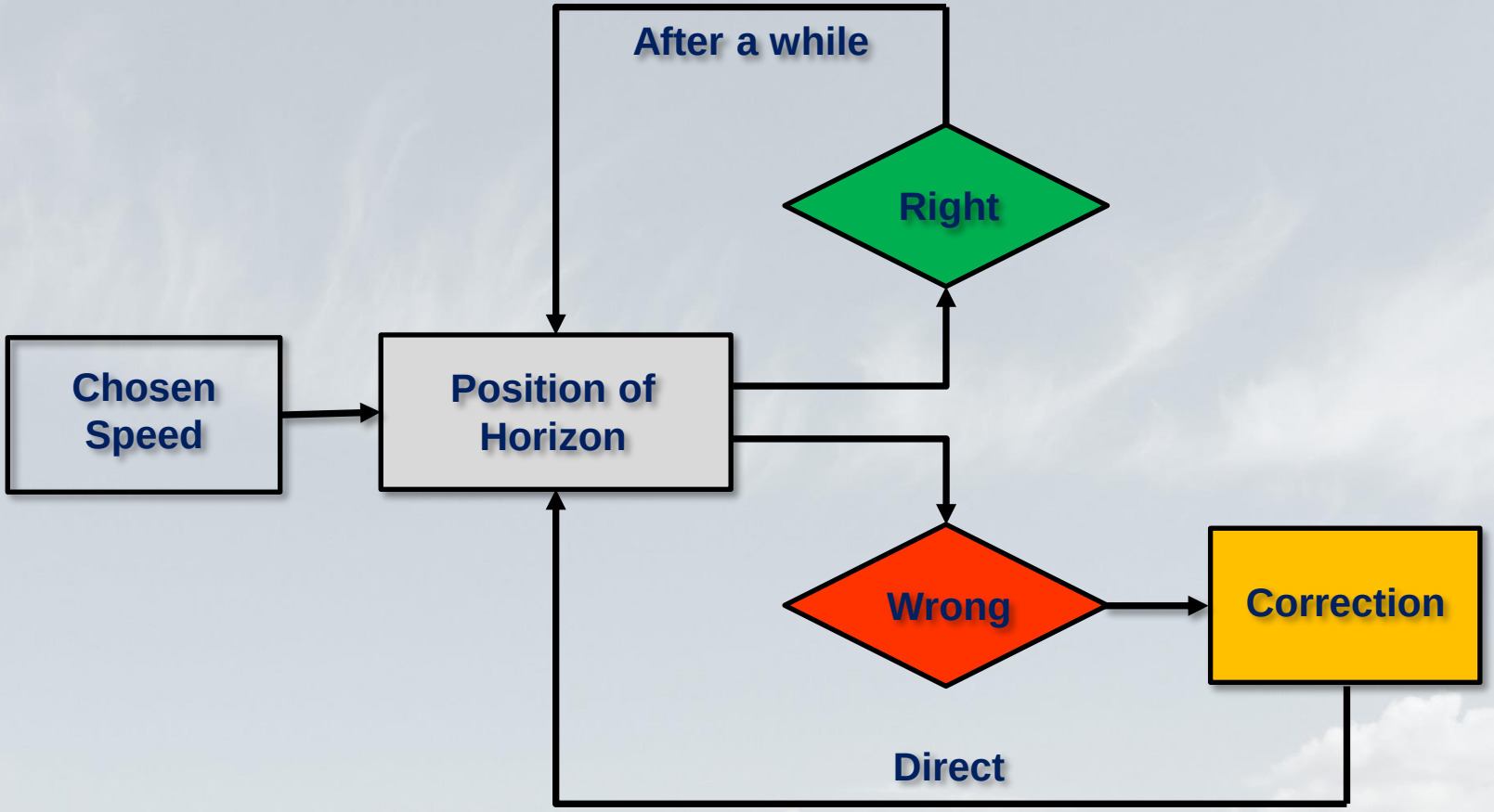
Maintaining a certain Airspeed:

Speed indicator



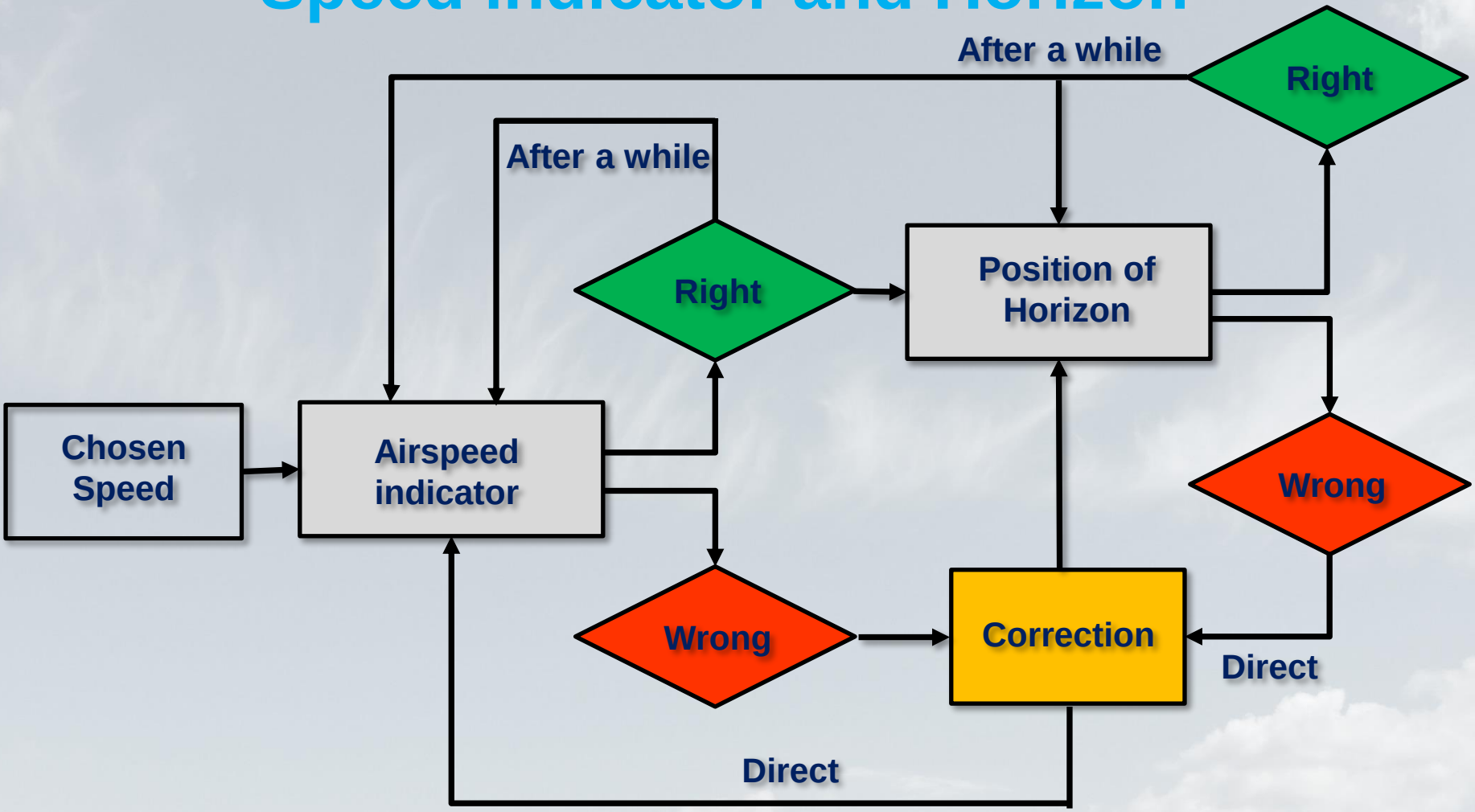
Maintaining a certain Airspeed:

Horizon



Maintaining a certain Airspeed:

Speed indicator and Horizon



Cyclical Interaction

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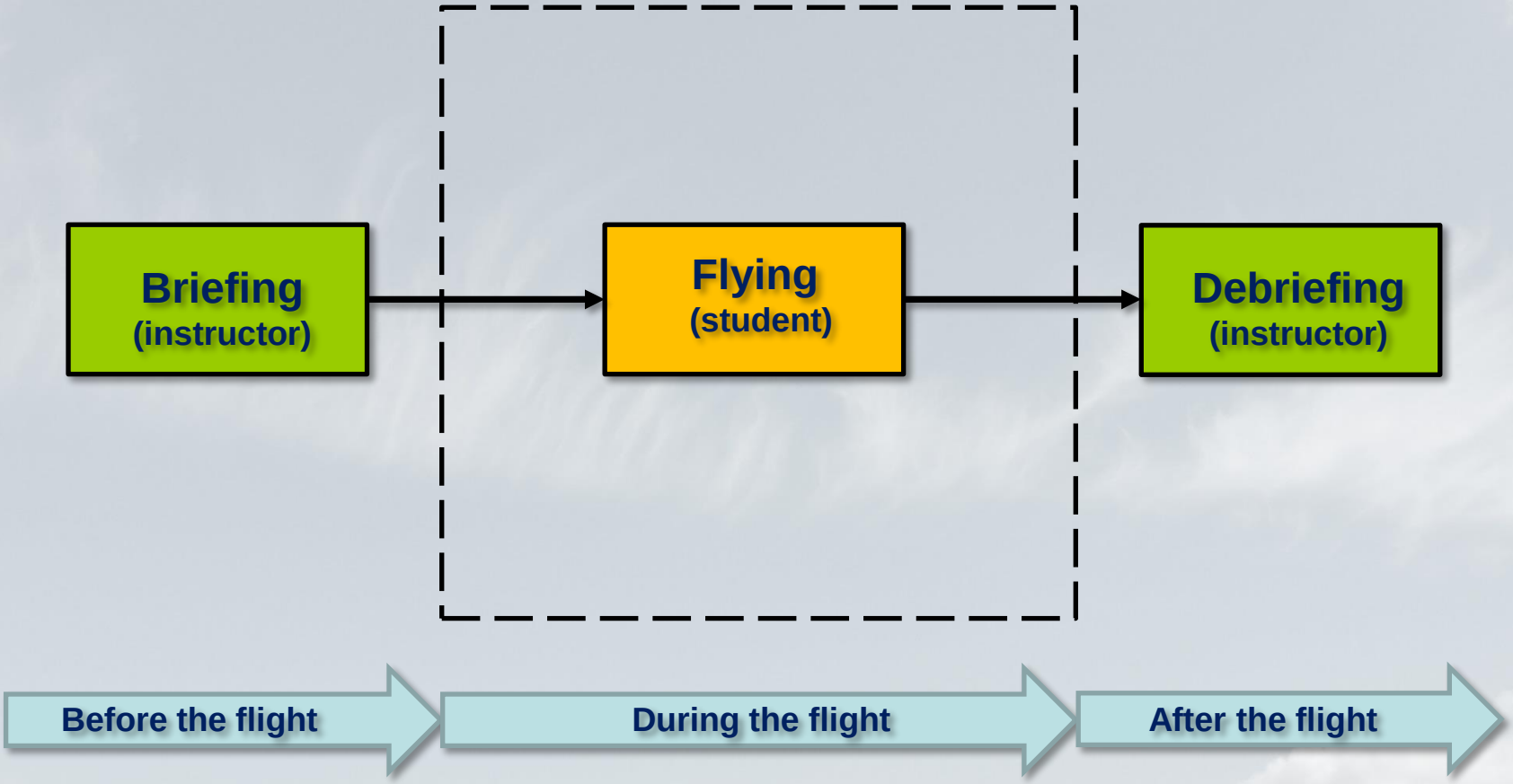
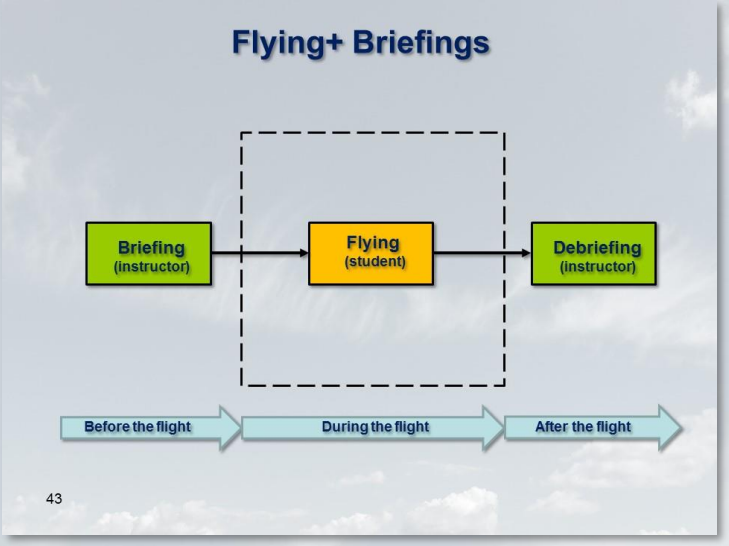
Instruction before, during and after the Flight

Flying + Briefings



What is discussed before the flight (Briefing)



Instructor

What are we going to do

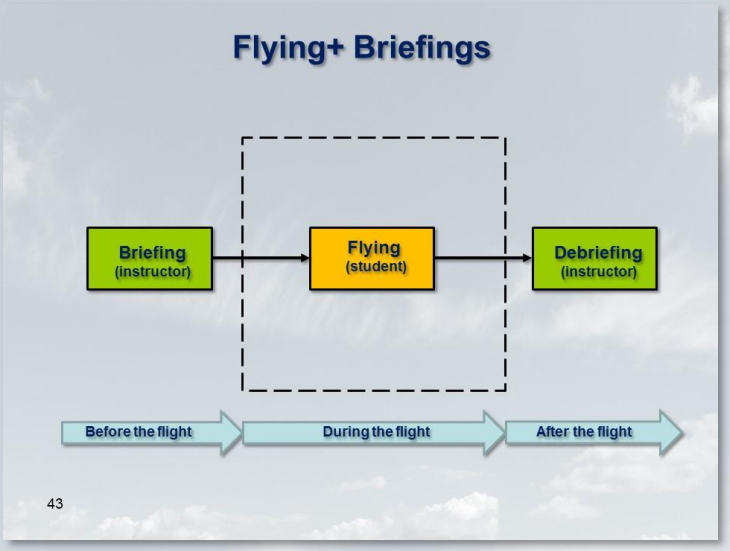
How much are we going to do

We don’t give a briefing for everything we are going to do

Student

Student indicates what he wants to do or to improve

What is discussed after the flight (Debriefing)



Instructor

Shares an analysis of the flight op part of it (reflection)

Explains what to improve and how to improve

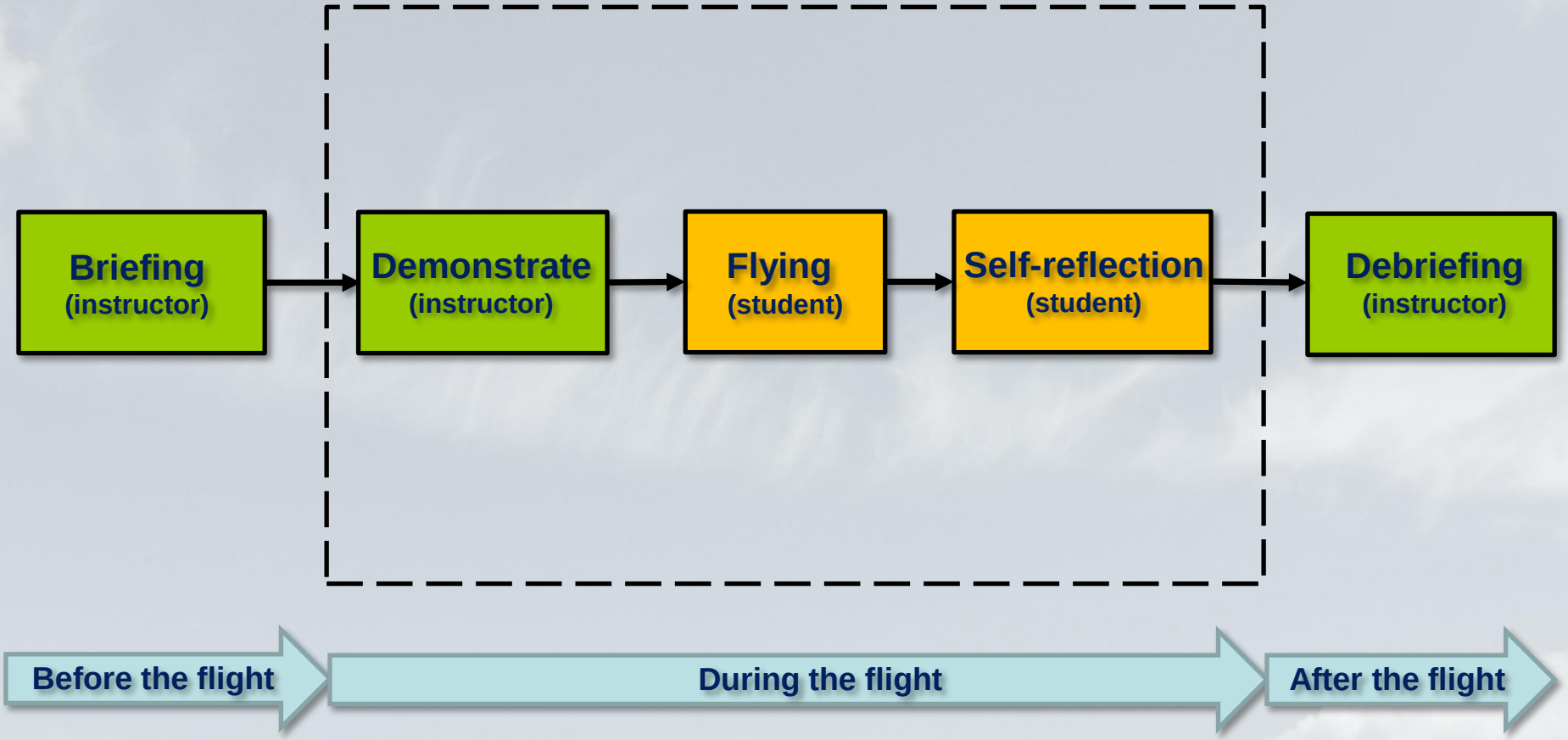
Let the student do the debriefing (self-reflection)

Student

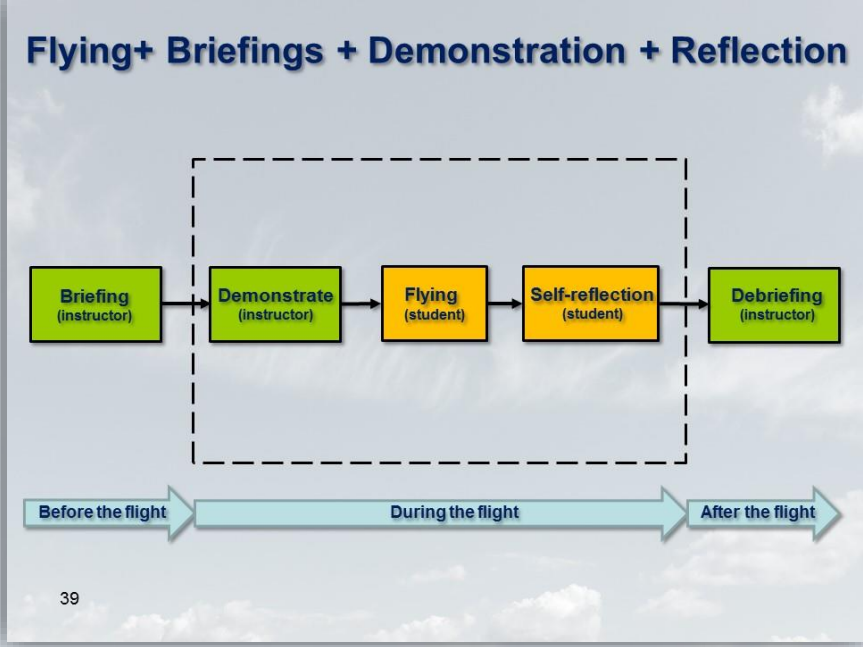
Summarizes his or her understanding of what could be improves and how (self-reflection)

Asks questions to ensure understanding the instructor

Flying + Briefings + Demonstration + Reflection



Types of Reflection

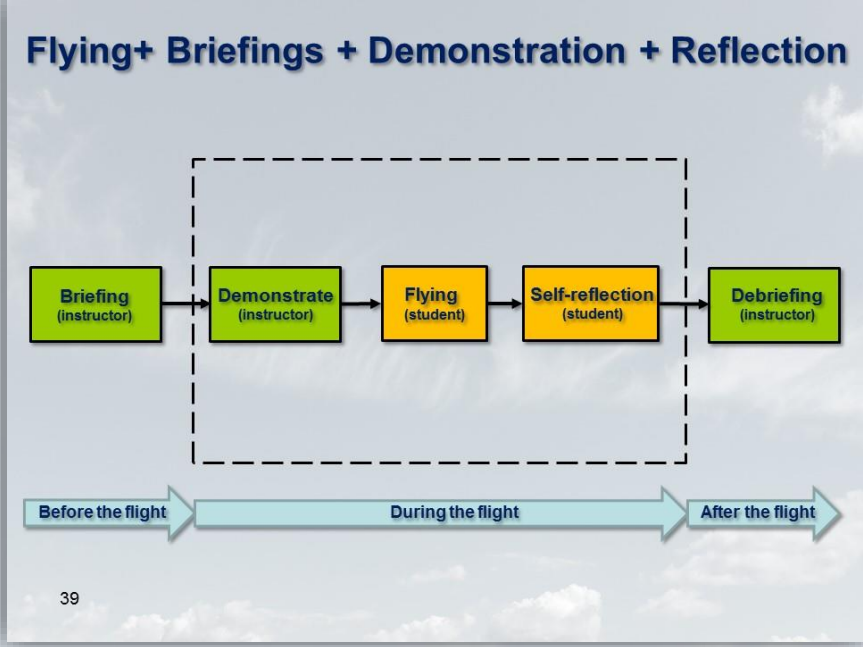


Reflection by the Instructor

Verbal reflection → **Verbal intervention**

Physical intervention →
- **Correction**
- **Intervention for safety reasons**
- **Intervention to avoid overloading**
- **Demonstration**

Types of Reflection



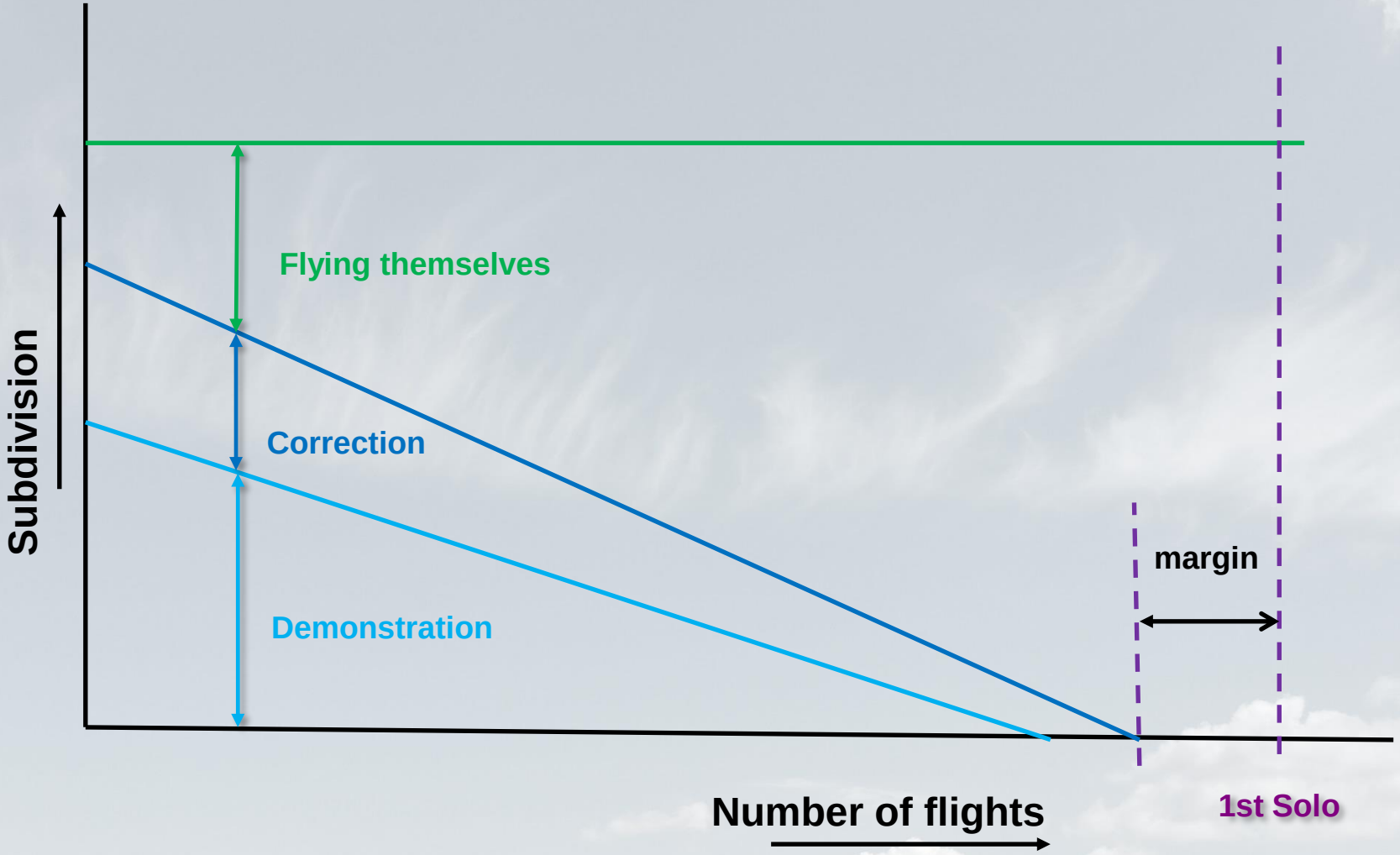
Reflection by the Student (Self-reflection)

Verbal reflection ⟶ **Verbal**

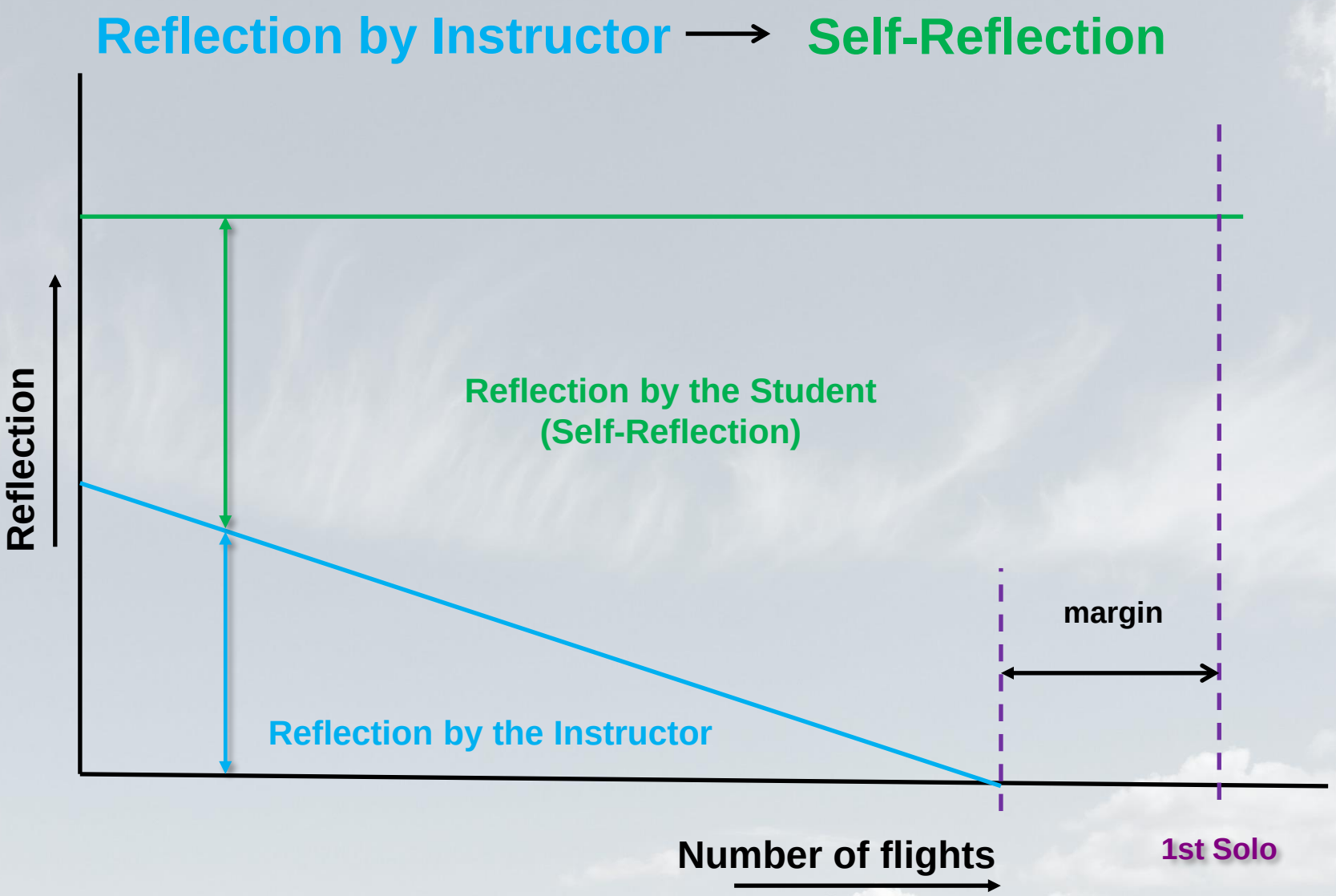
Physical reaction ⟶ **Action**

Development during the training

Demonstration → Correction → Flying themselves



Development during the training



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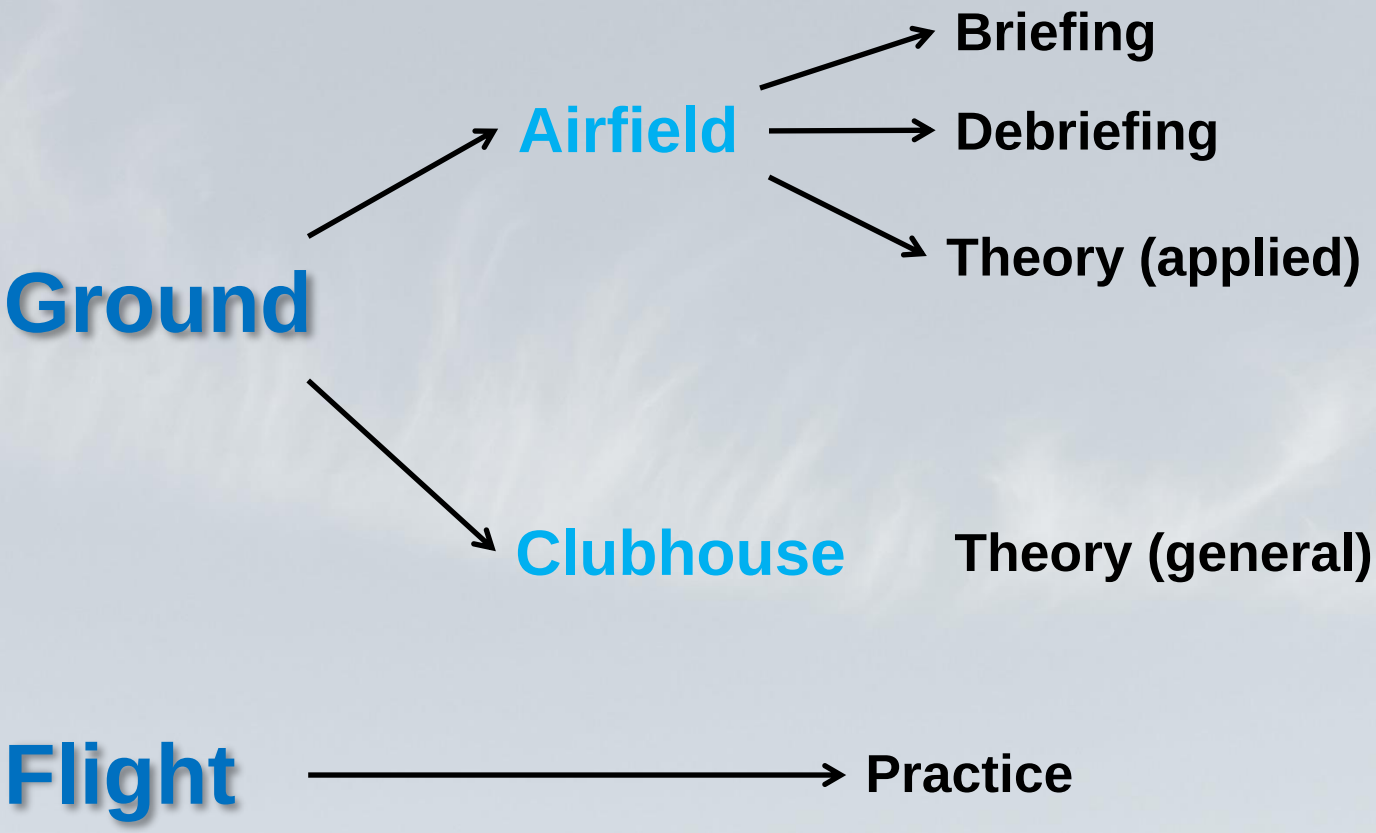
Instruction Techniques

Instruction moments



Types of transfer:

Ground

Briefing

Debriefing

Field

Theory (applied)

Means of transfer

Verbal	Drawing
Gestures	Models

Clubhouse Theorie (general)

Verbal	Drawing
Gestures	Models
	Projection

Flight

Practice

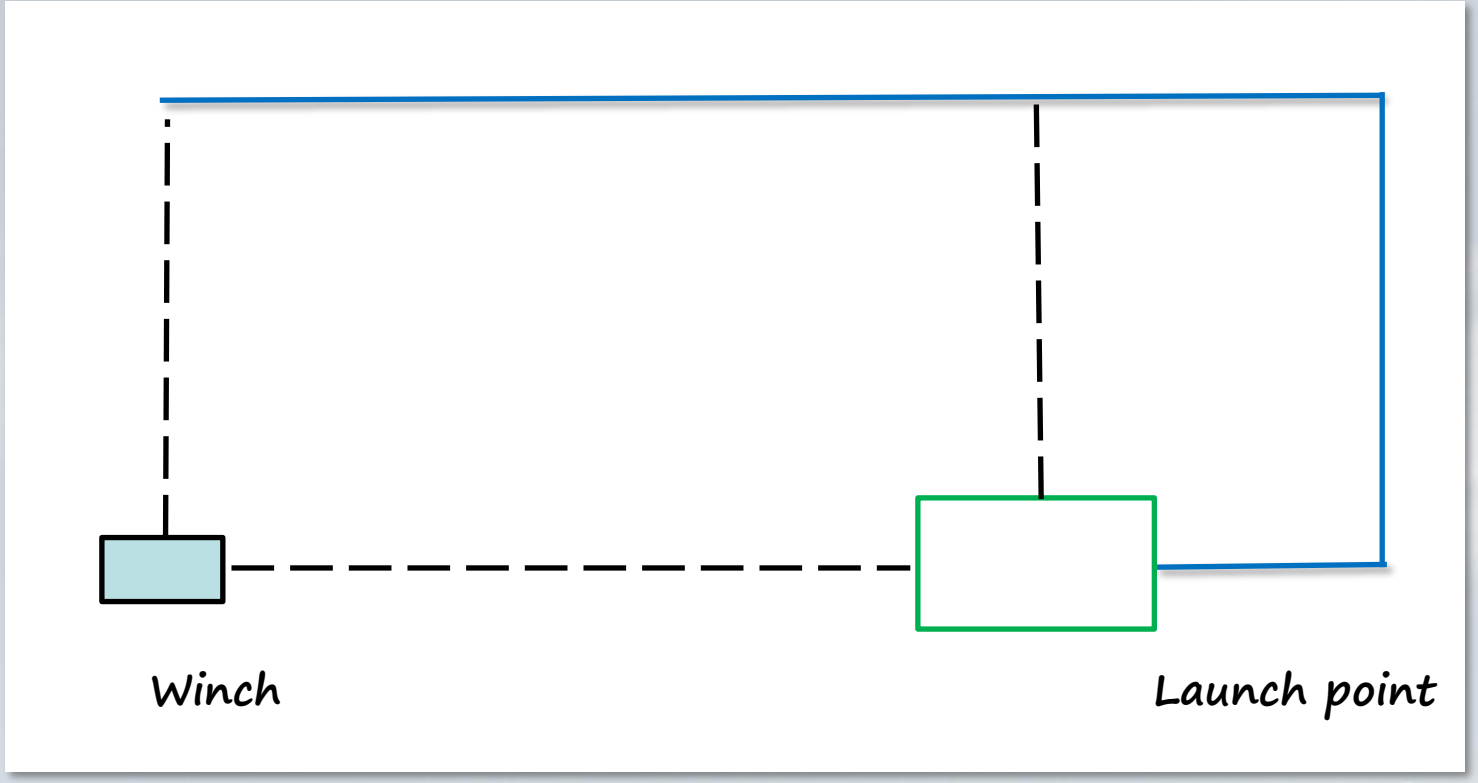
Verbal	Demonstrate
	Intervention

Transfer resources on the Ground

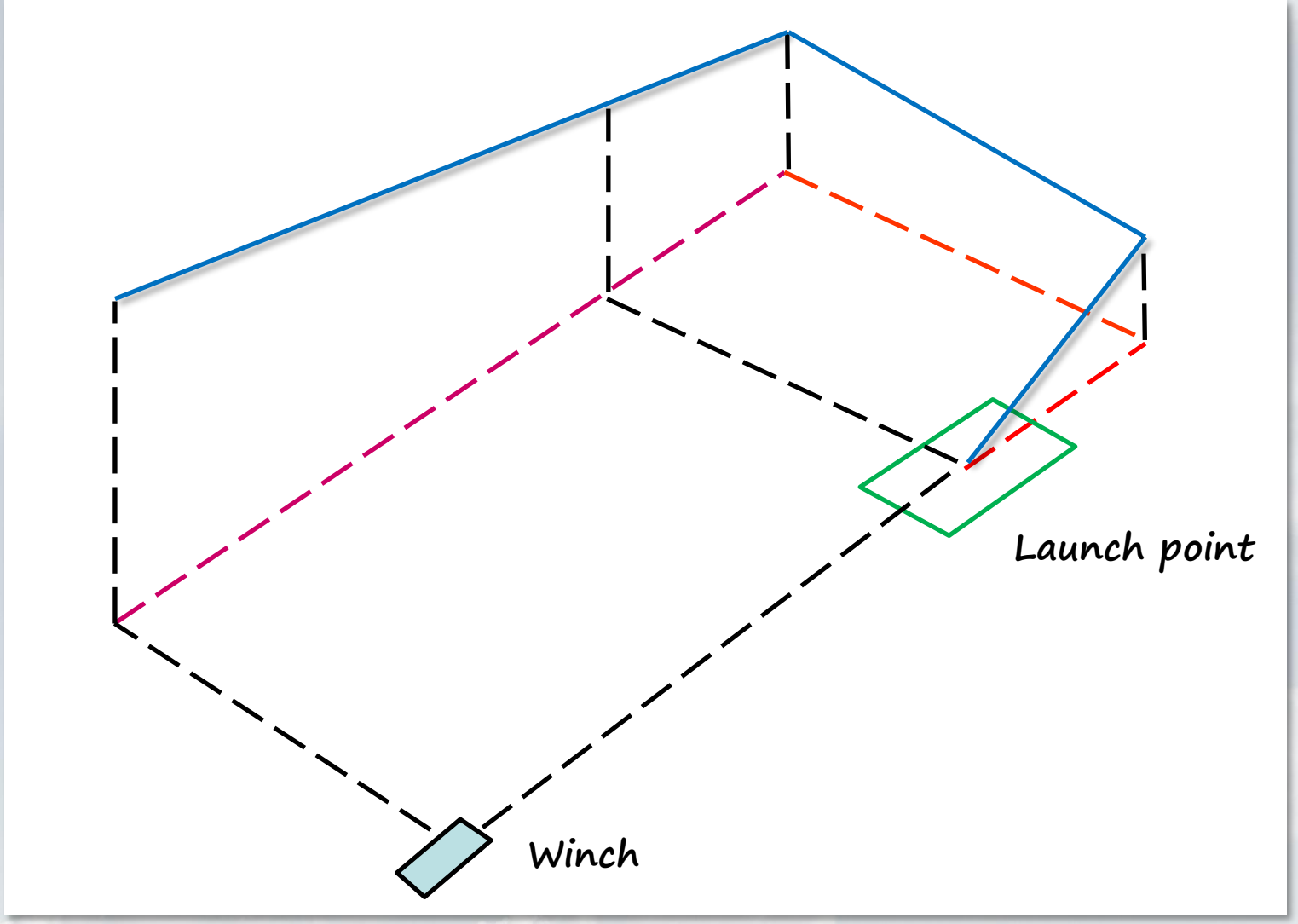
Verbal	Verbal	Student translates into Images and Process
Gestures	Visual	Images and Process Supporting and Strengthening of the Verbal
Drawing	Visual (2D en $2^{1/2}$ D)	Image and Process Layered (Colors)
Projection	Visueal (2D en $2^{1/2}$ D)	Image and Process Layered (Colors)
Models	Visual (3D)	Build up Model — Process Prepared Model — Static Dynamic

2 D Representation

Circuit



$2^{1/2}$D Representation (Isometry): Circuit



Types of transfer during the Flight

Verbal	**Verbal**	**Student translated into Image and Action**
Demonstrate	**Visual** **Feeling**	**Verbal and Feeling enhance each other**
Intervention	**Verbal** **Not Feeling**	**Telling the Student not to move the Controls**

6

Analysis of Mistakes

Reason for the Mistakes

Did not learn well

Did not understand fully

Not Aware

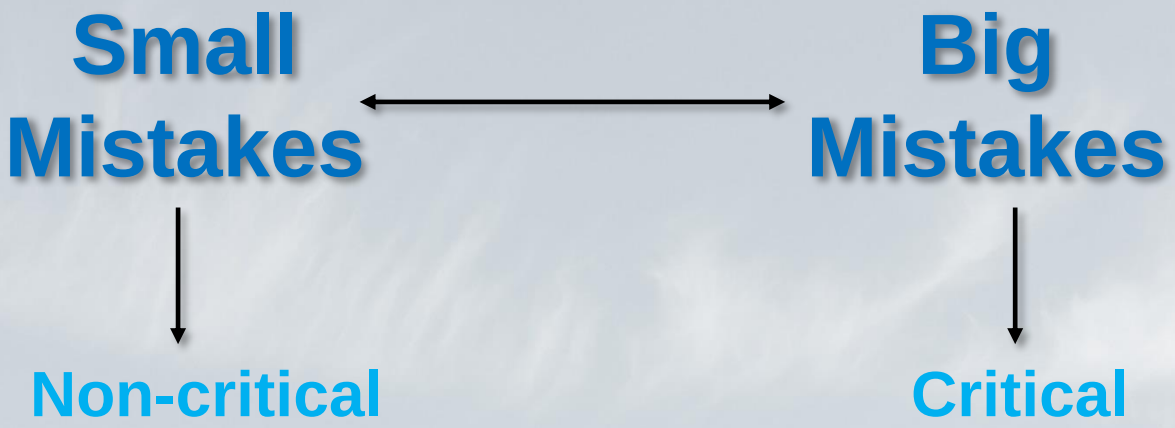
Not enough attention

Conscious Choice

Too much pressure

It’s always a Mixture

Types of Mistakes



How to deal with Mistakes

Mistake

Moment of failure or **Moment of improvement**

I can **not** do it

I can **never** do it

I can’t do it **yet**

I can do it **almost**

Yes, I can do it

How does the Student know which Mistake(s) were made?

Recognized by student

Instructor tells student

Self-Reflection

Reflection by somebody else

7

Evaluate

Evaluating several facets

What is Evaluating:

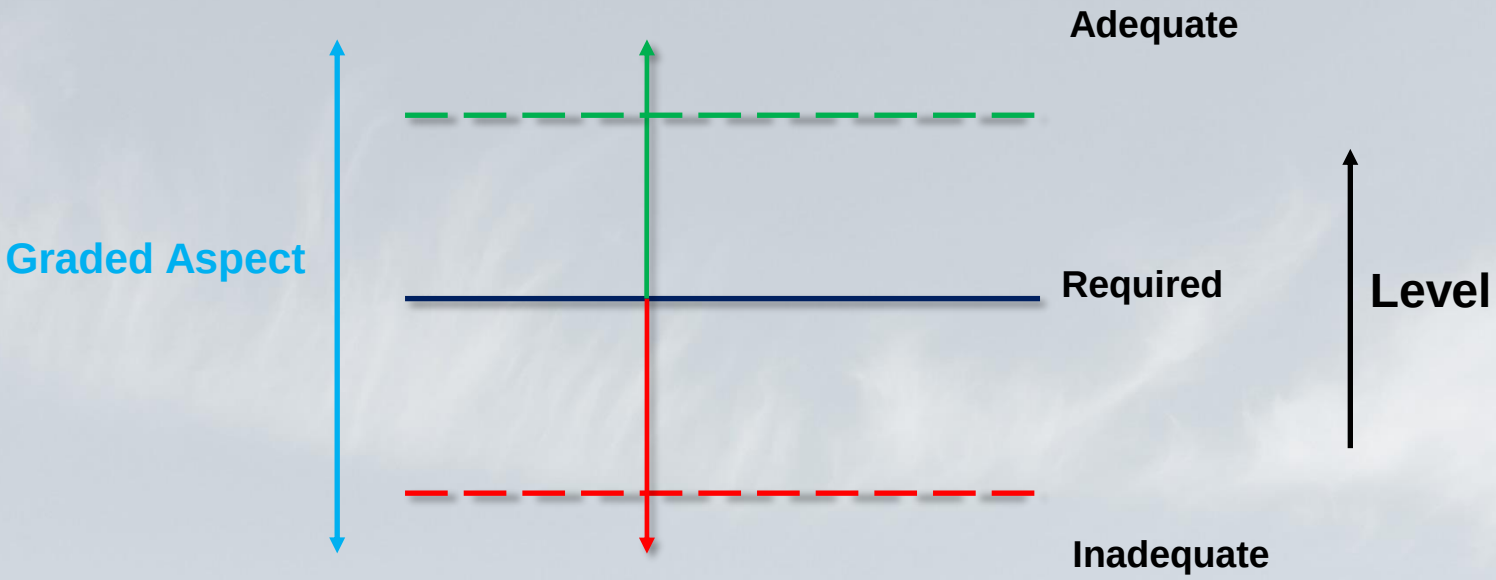
What do we Evaluate

How do we Evaluate

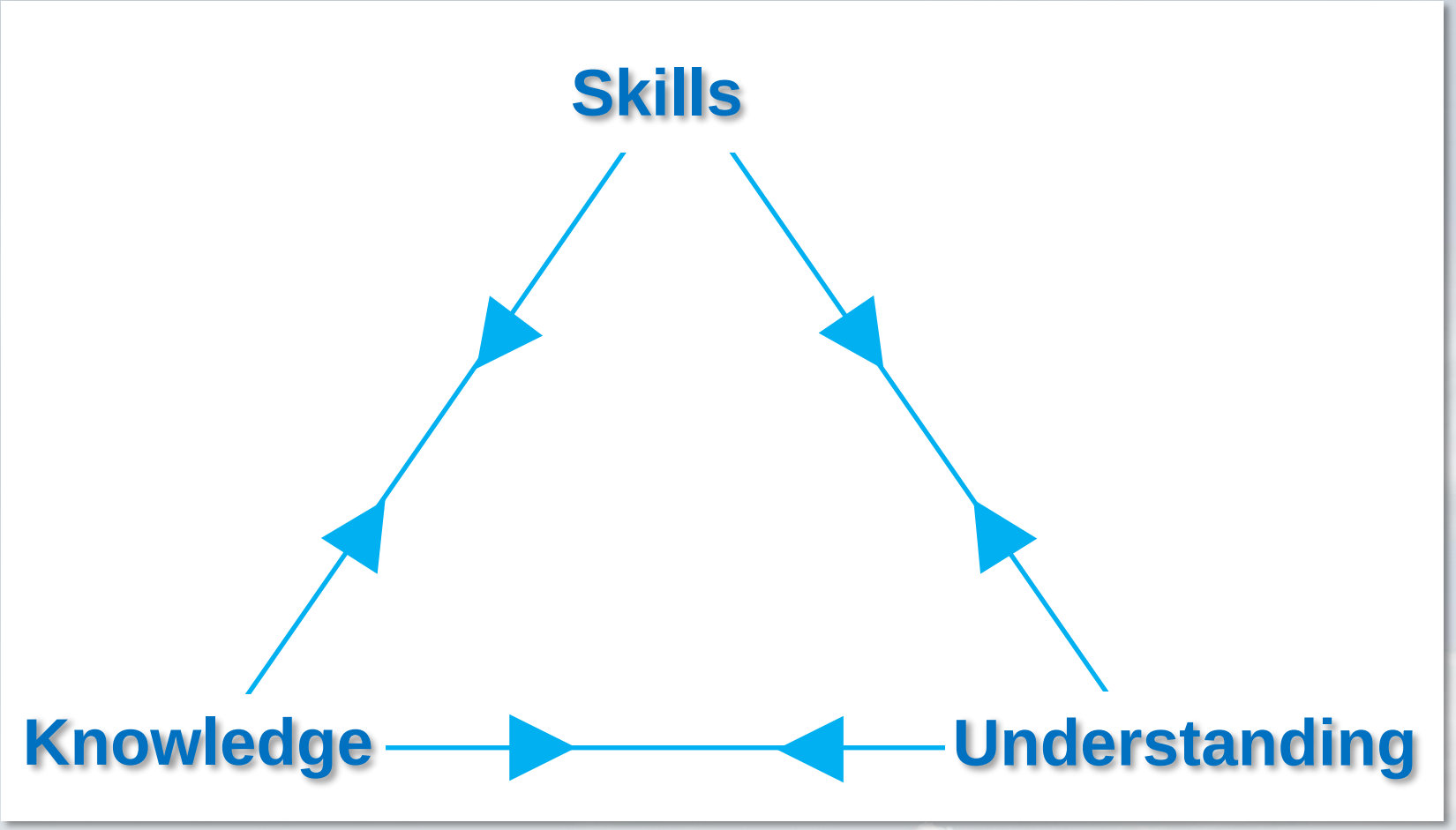
Who are we Evaluating

When do we Evaluate

What is Evaluating



What do we Evaluate



How do we Evaluate

Who are we Evaluating

Student	**Self-reflection**
Instructor	**Reflection + Rating**
Examiner	**Rating**

When do we Evaluate

Evaluation Moments

A Flight

During the Flight	Limited
After the Flight	More extensive

After several Flights

During the Flight	Limited
After the Flight	Much more extensive

8

Motivation and Demotivation

Students and their motivation

Motivation ⟷ **Demotivation**

There is no progress

There is regression

Others are better than me

I still can’t fly solo

From Demotivation to Motivation

Demotivation	Motivation
There is no progress	We are getting more experienced in things we already know
There is regression	We learn how to cope with regression, learn from it and improve our flying
Others are doing better than me	Let's put our energy in our own flying
I still can't fly solo	Analyse why this is the case

9

Competence and Awareness

The Extremes and what's in between:

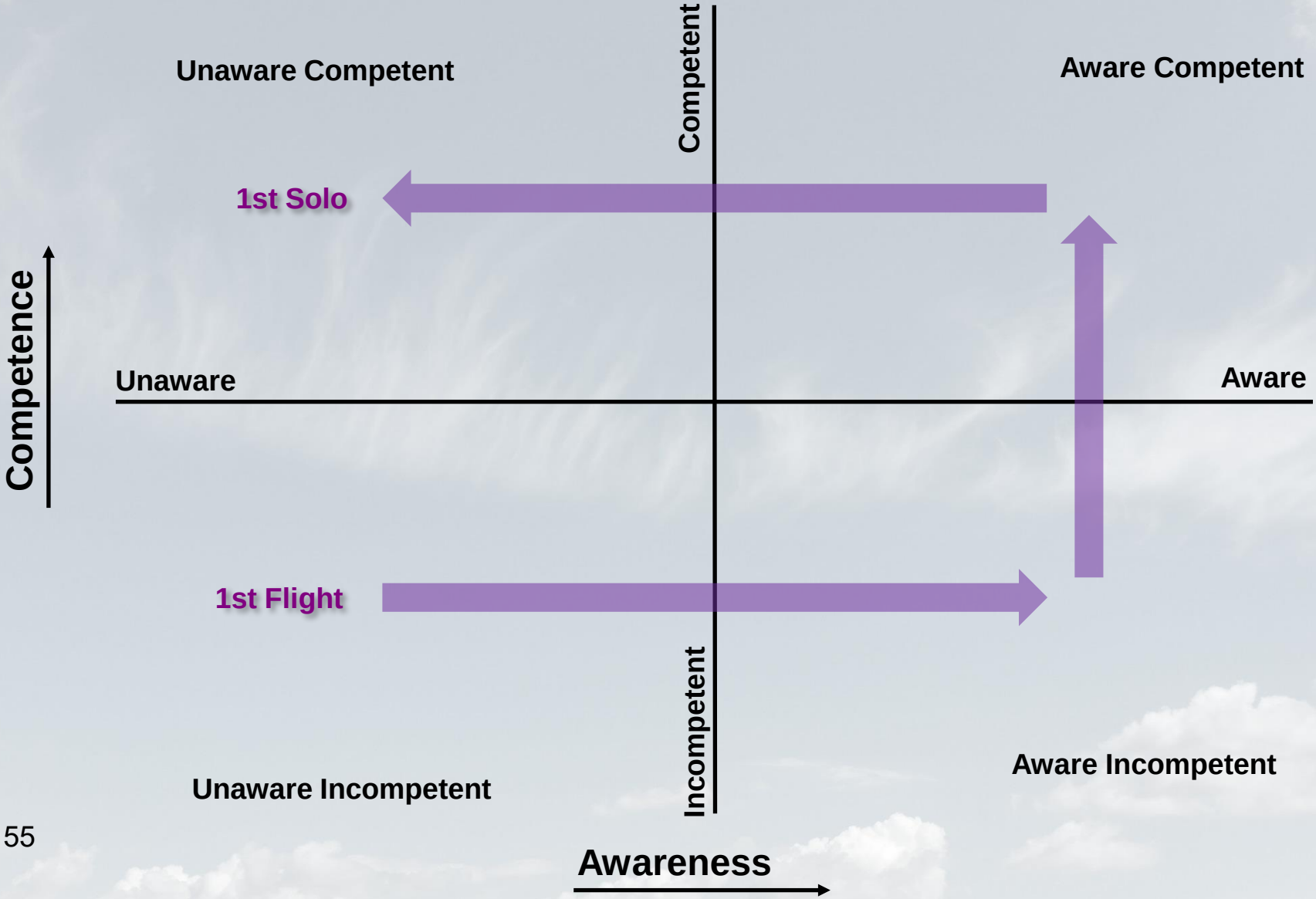
Incompetent ⟷ **Competent**

Unaware ⟷ **Aware**

Be able to judge which level

Competence – Awareness: Four quarter model

(Zijp)



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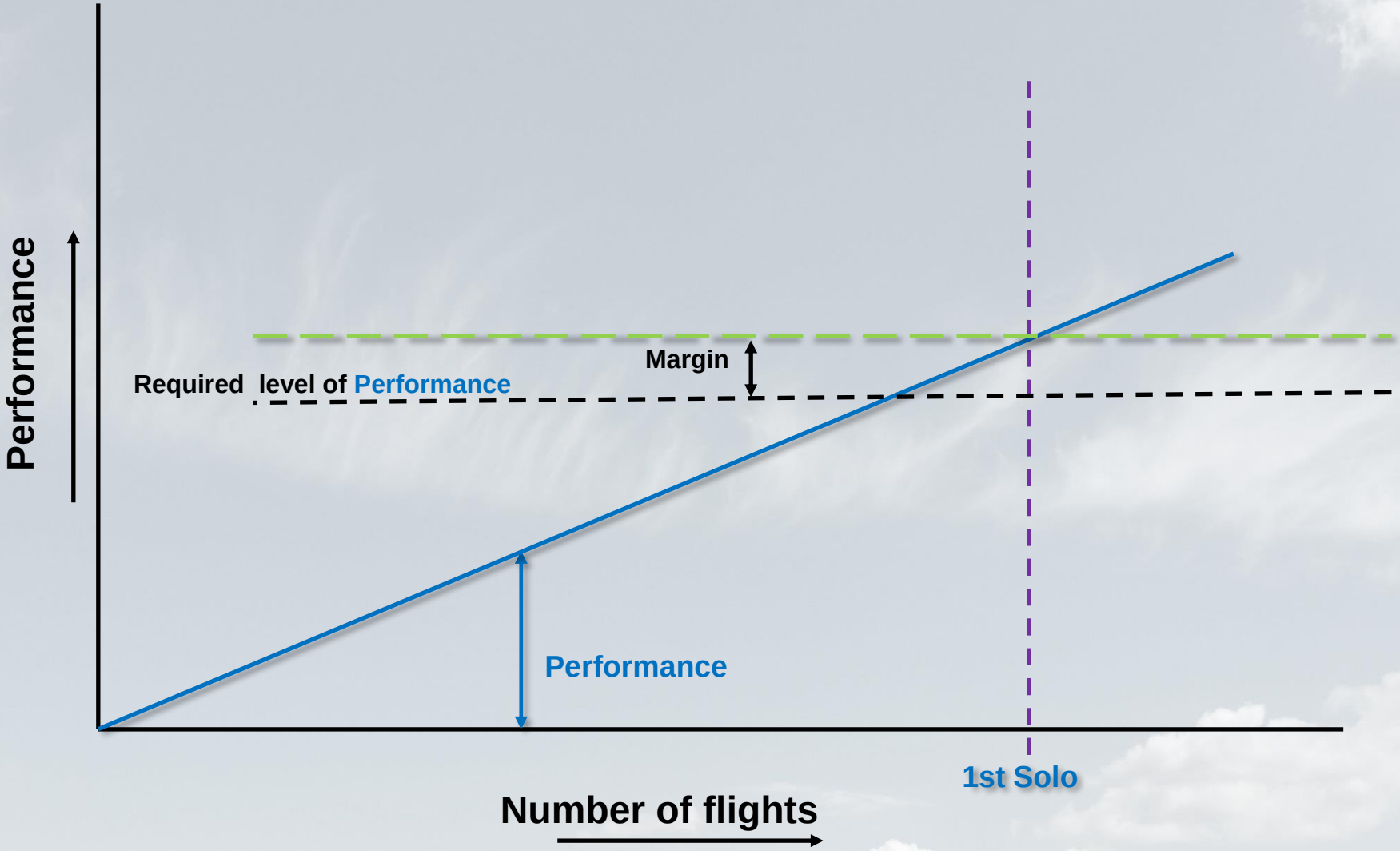
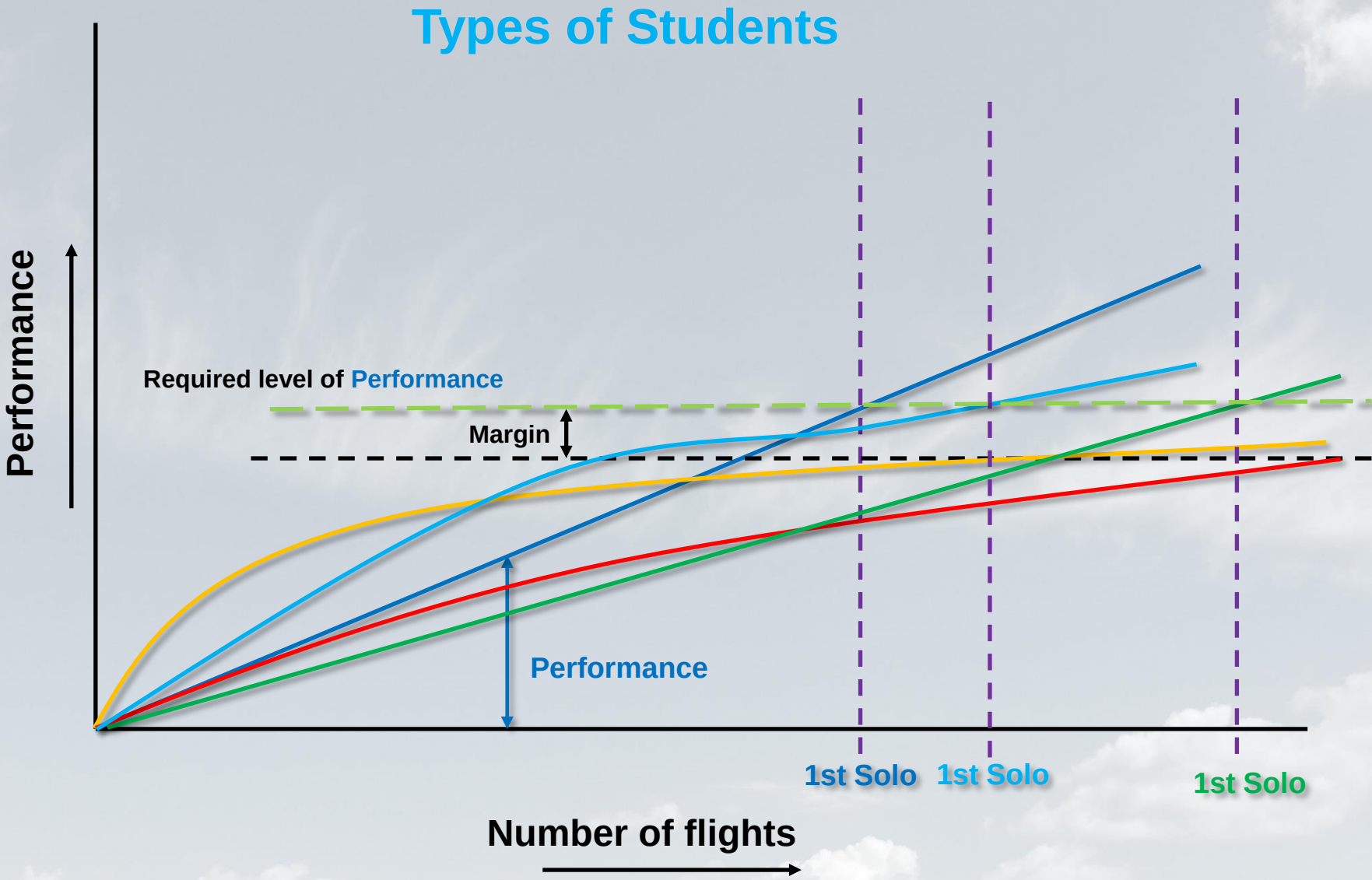
Learning Speed

Learning Speed



Progress of Learning Speed



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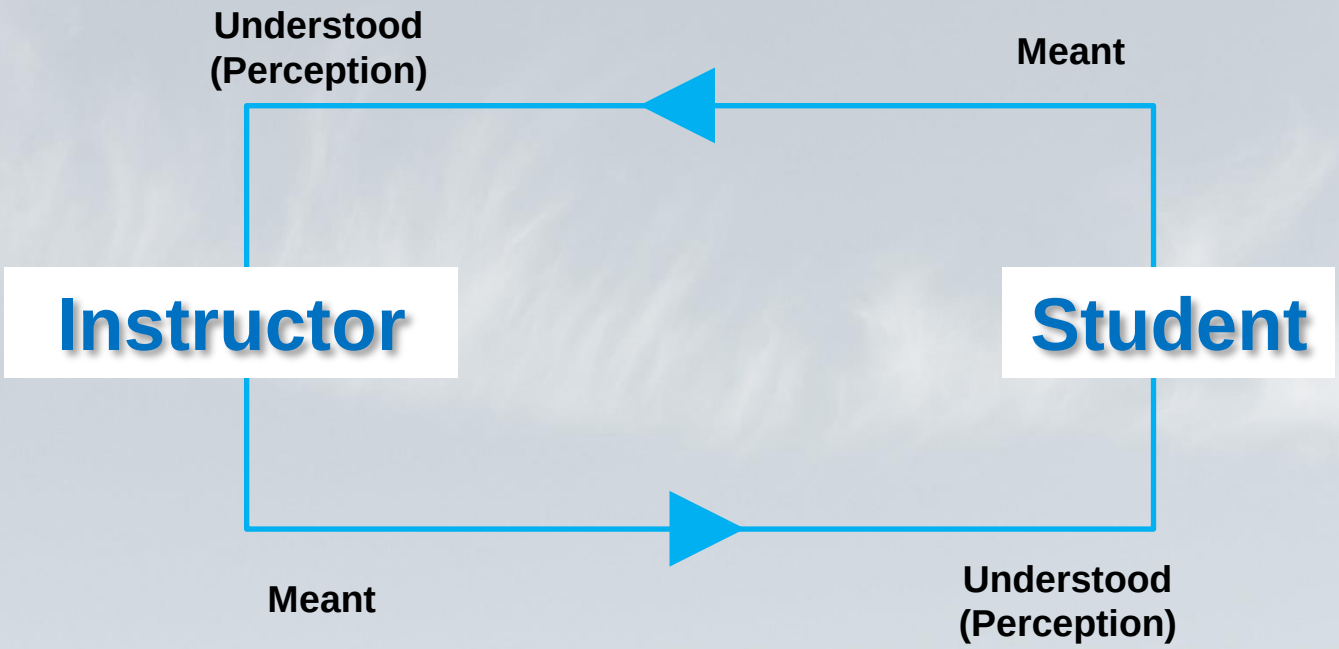
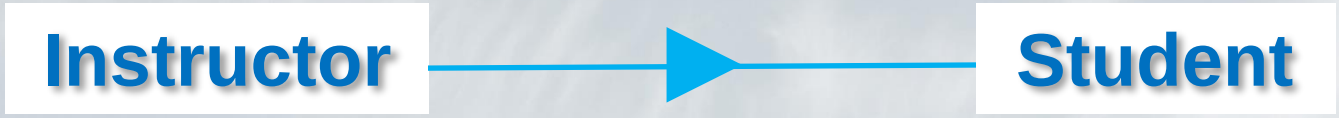
Communication: Sending and Receiving

Communication: Sending and Receiving

Meant and Understood

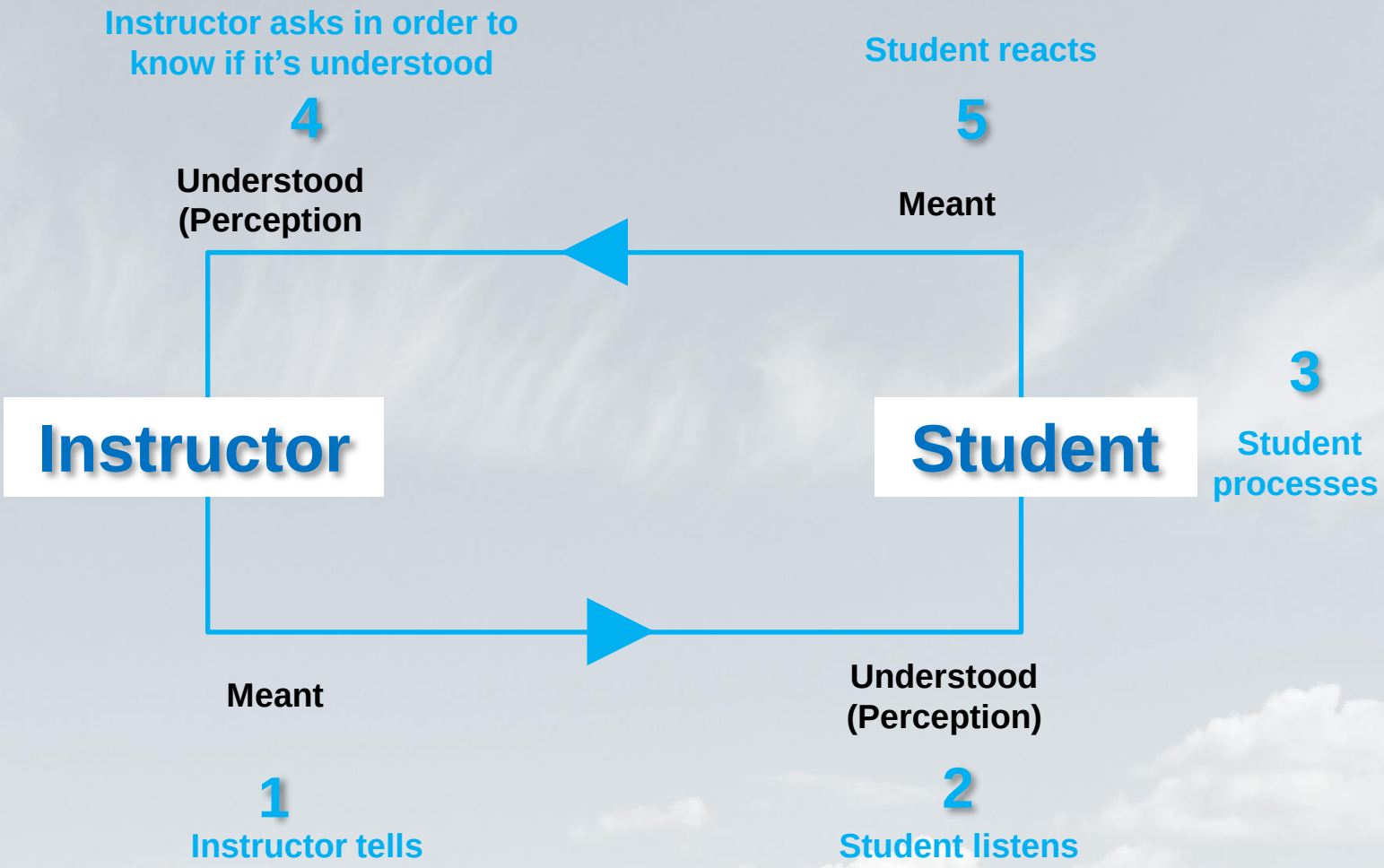


Linear Communication



Cyclical Communication

Optimal Cyclical Communication



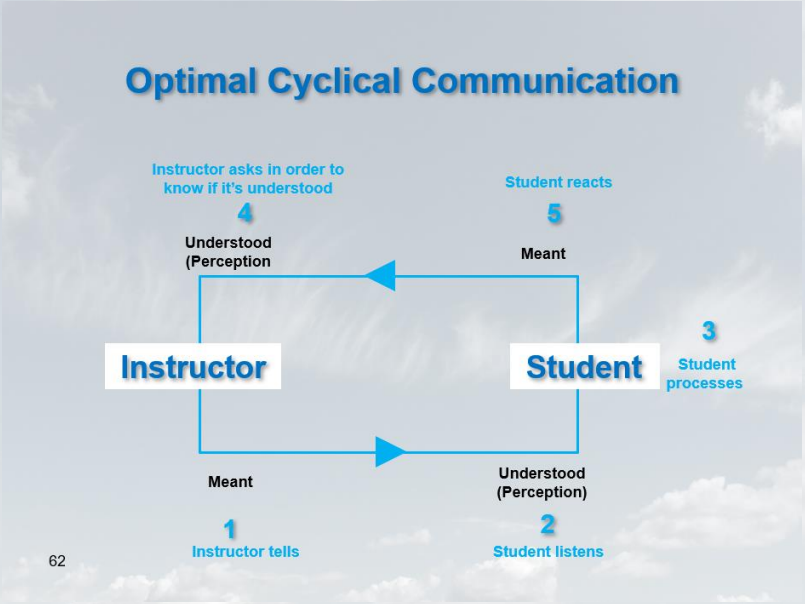
Communication

Aspects of Optimal Communication

Clear

Precise

Right amount of Information



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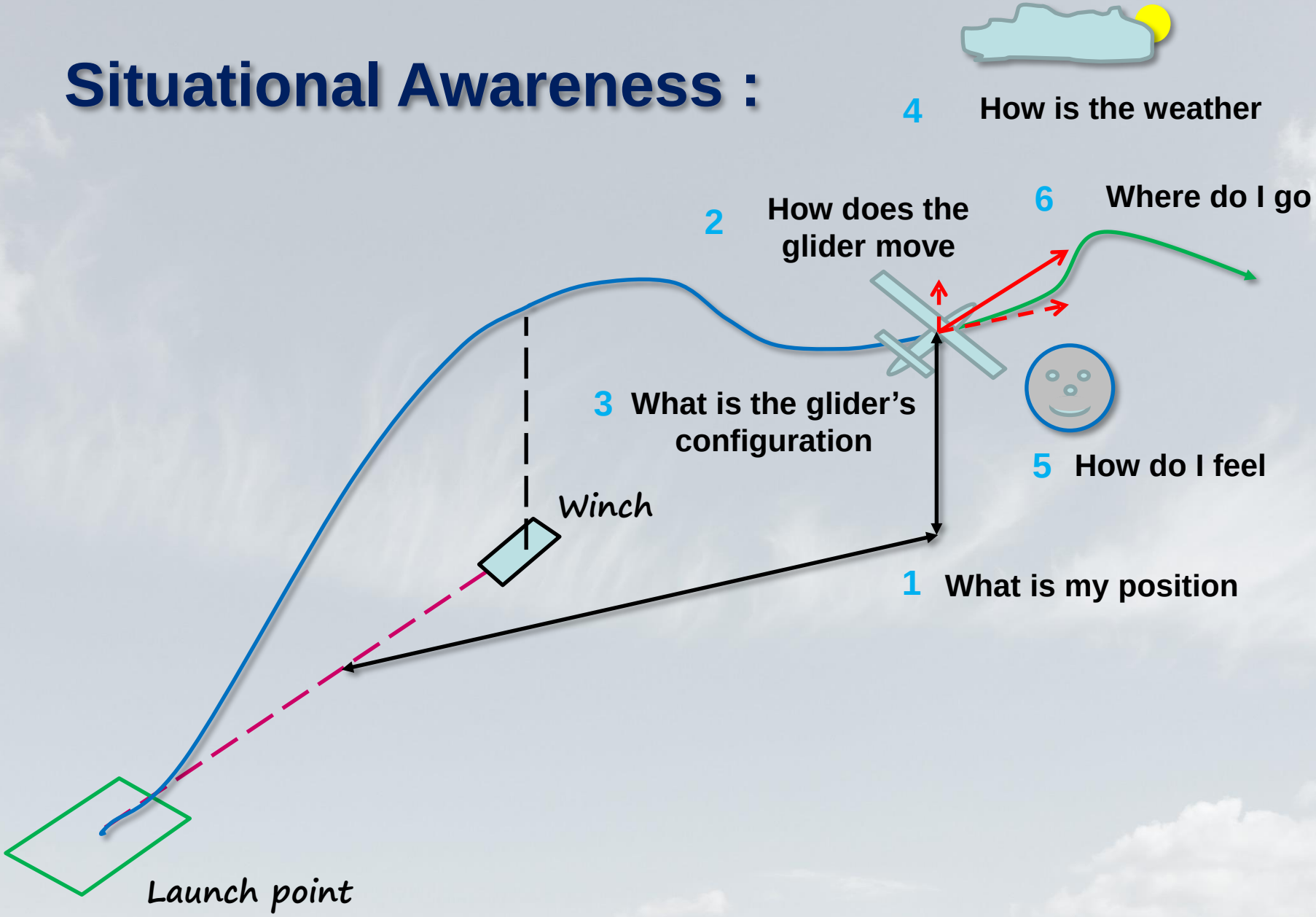
Situational Awareness

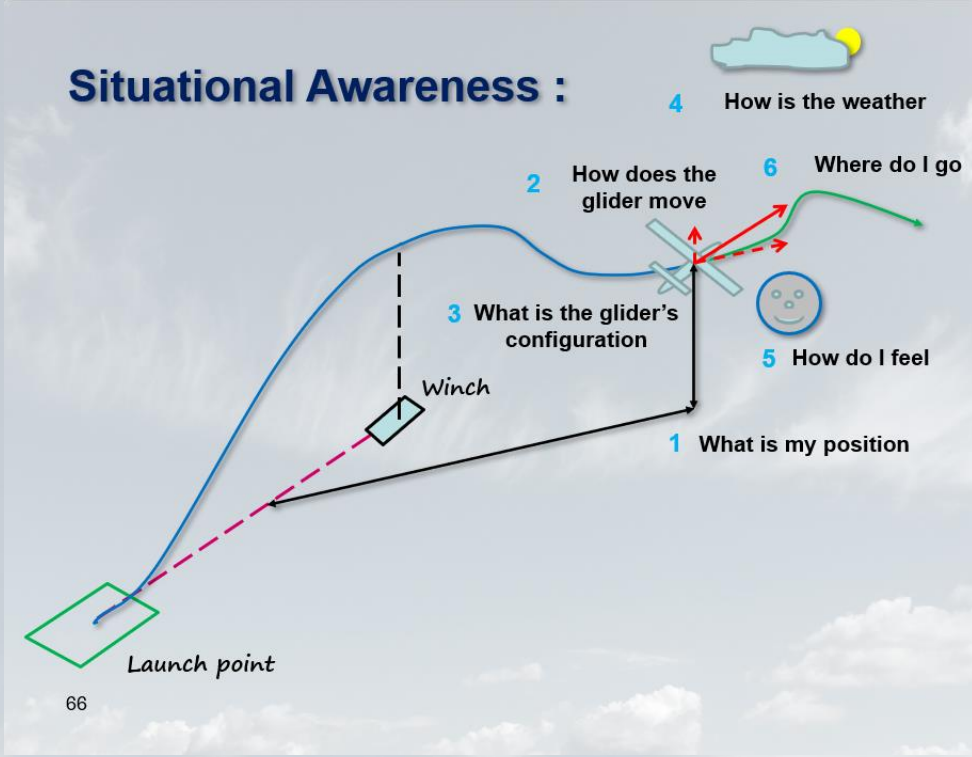
Situational Awareness

Situational Awareness :



What is my position:

1



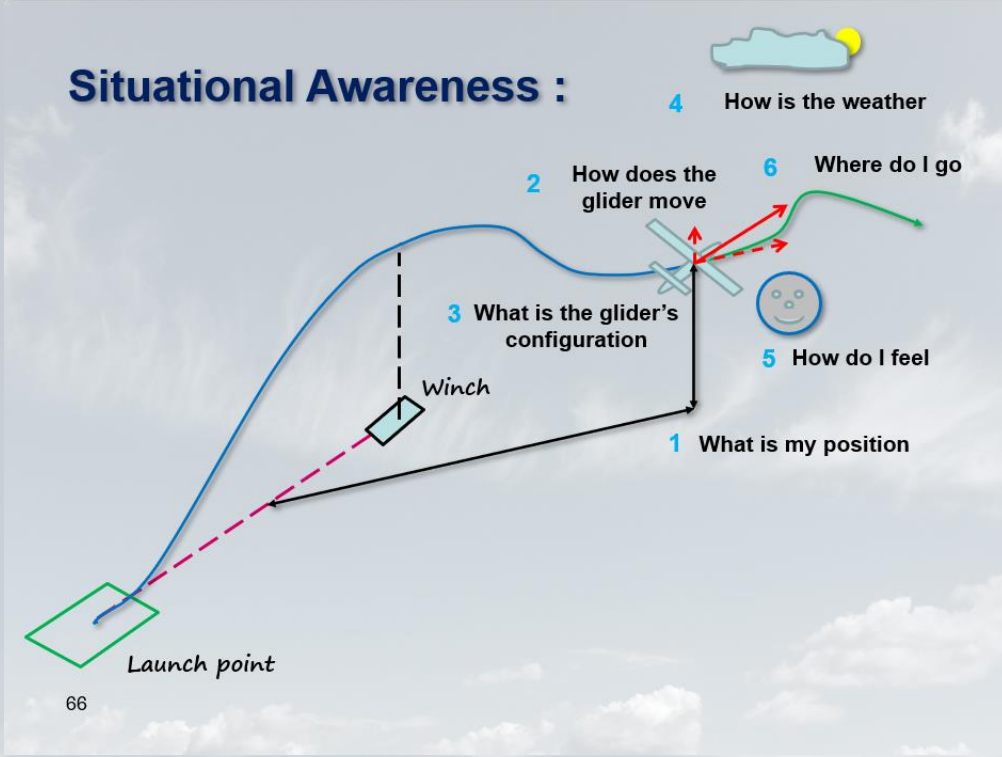
In relation to the airfield:

Distance — In relation to my gliding angle

Altitude — Absolute (or relative)

How does the glider move:

2



Speed:

Horizontal Speed

- Minimal
- Optimal
- Maximal

Vertical Speed

- Ascending
- Decending

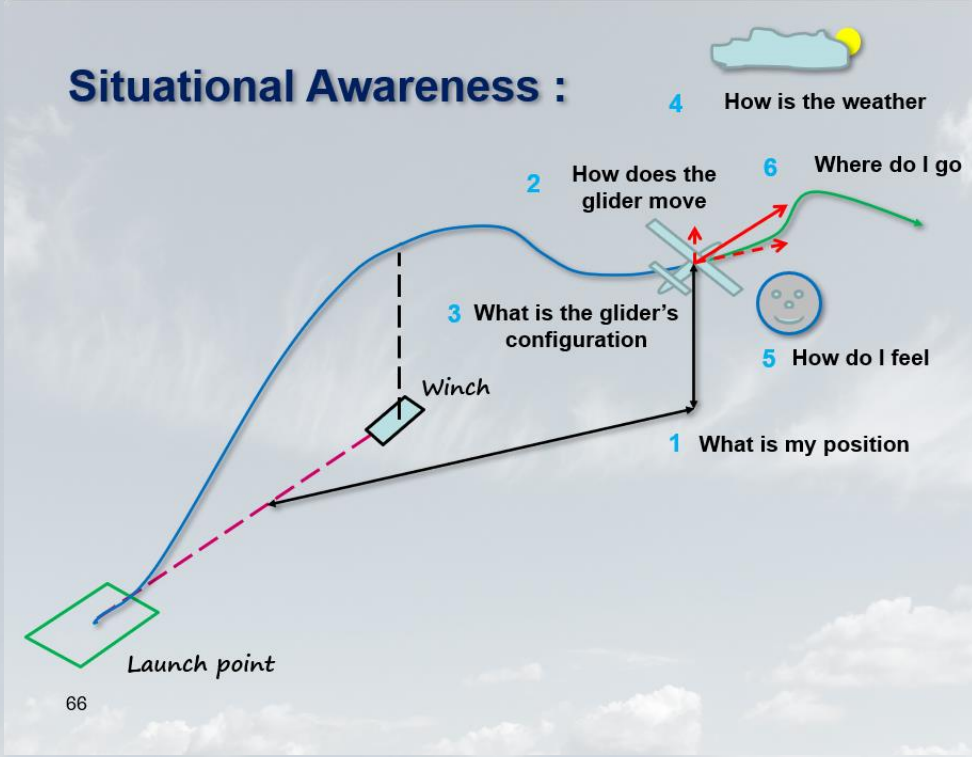
Position relative to:

Angles relative to the axes

- Longitudinal axis — Bank
- Vertical axis — Slipping / Skidding
- Lateral axis — Pitch

What is the gliders configuration:

3



Wheel

Retracted

Extended

Brakes

Which position

Locked

Flaps

Position for a certain air speed

Hook

Gravity or Nose hook

Cable connected

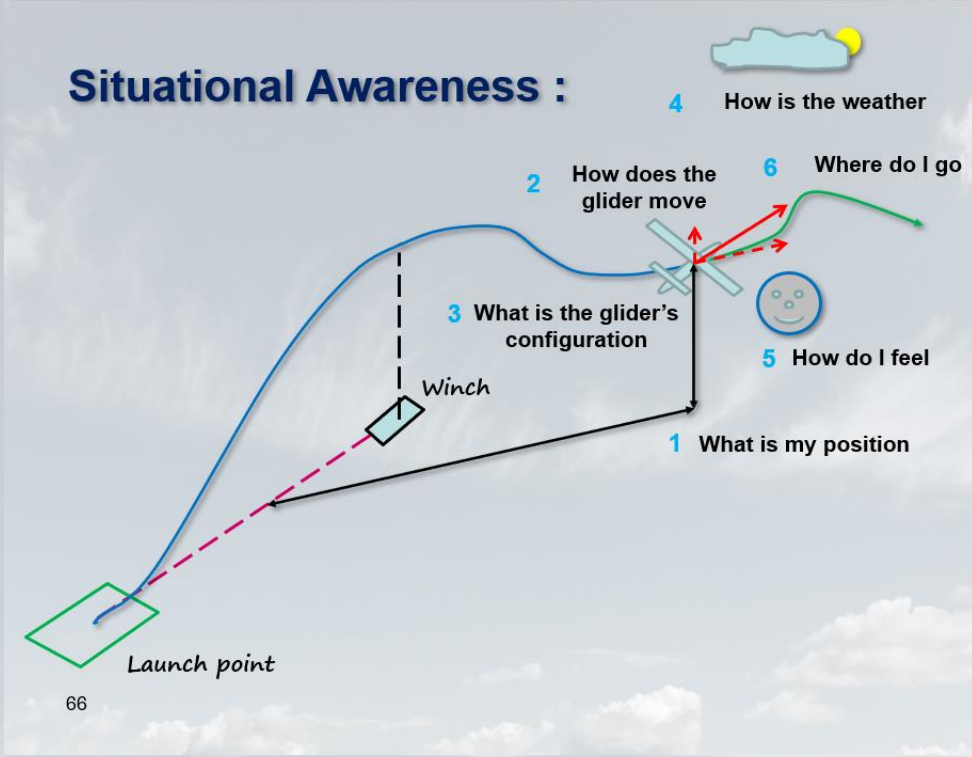
Cable released

Ventilation

Fresh air

Condensation on the Canopy

How is the weather:



4

Wind:

- Speed — Limits
- Direction — Limits
- Change
- Gradient

Clouds:

Type

- \+ Cu
- \- Cb

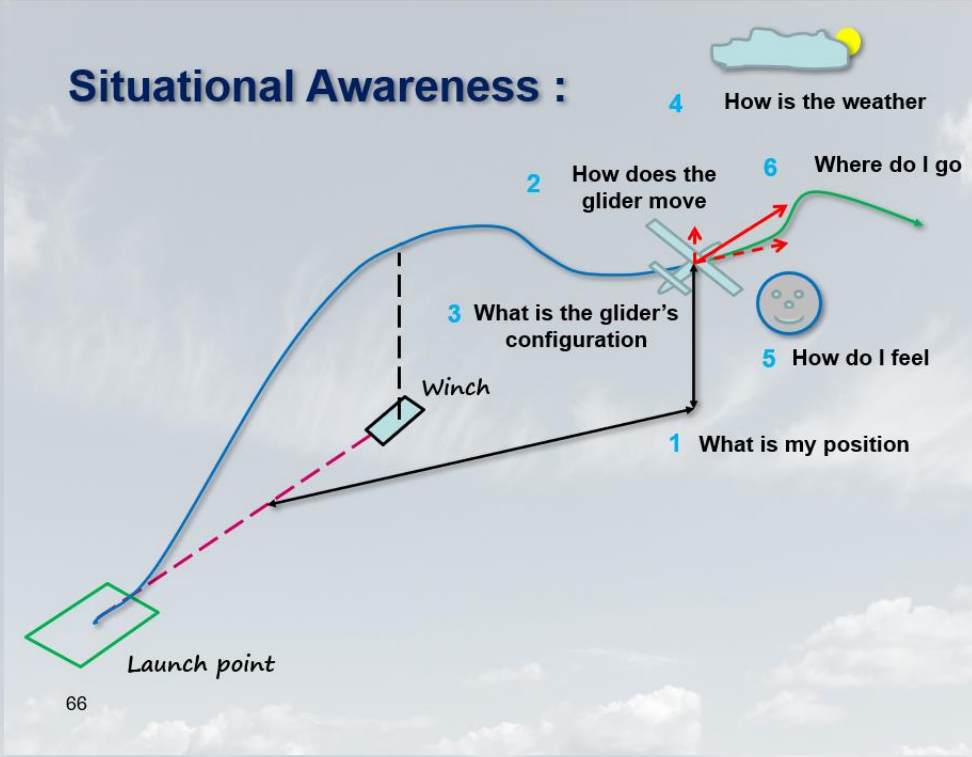
Cloud cover

Precipitation:

- Type
- Intensity

How do I feel:

5



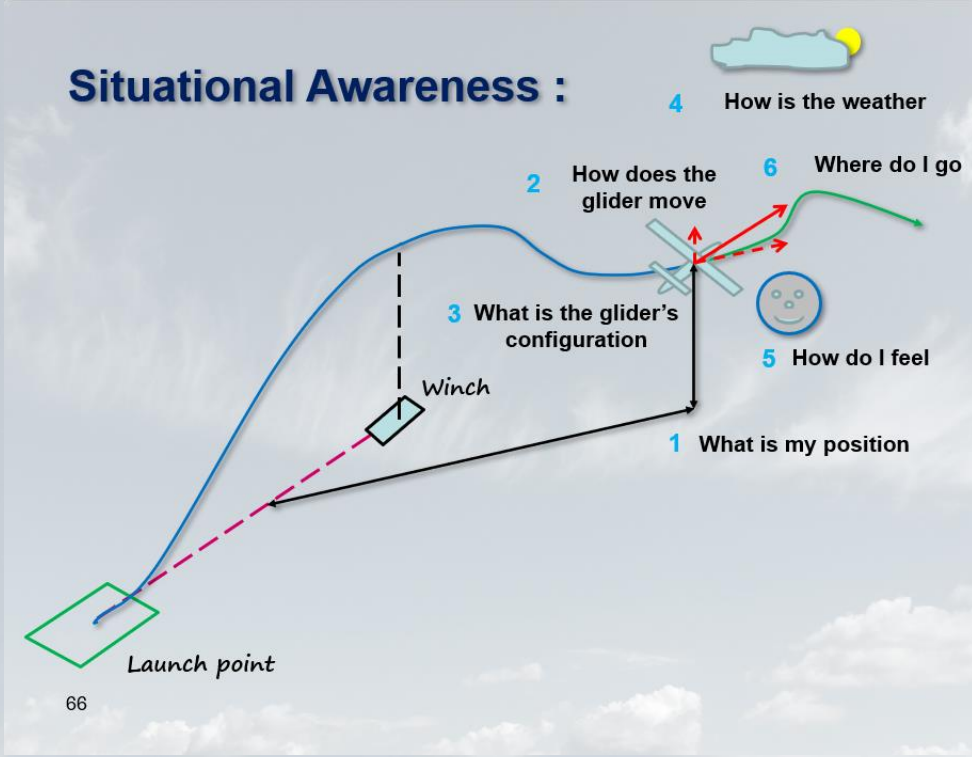
Drinking	Dehydration
Toilet	Kidneys
Sweatning	Too warm Dehydration
Nauseous	Throw up

Tired

Concentrated

Where do I go:

6



What will be my coming situation in regard to:

1 What is my position

2 How does the glider move

3 How is the glider

4 How is the weather

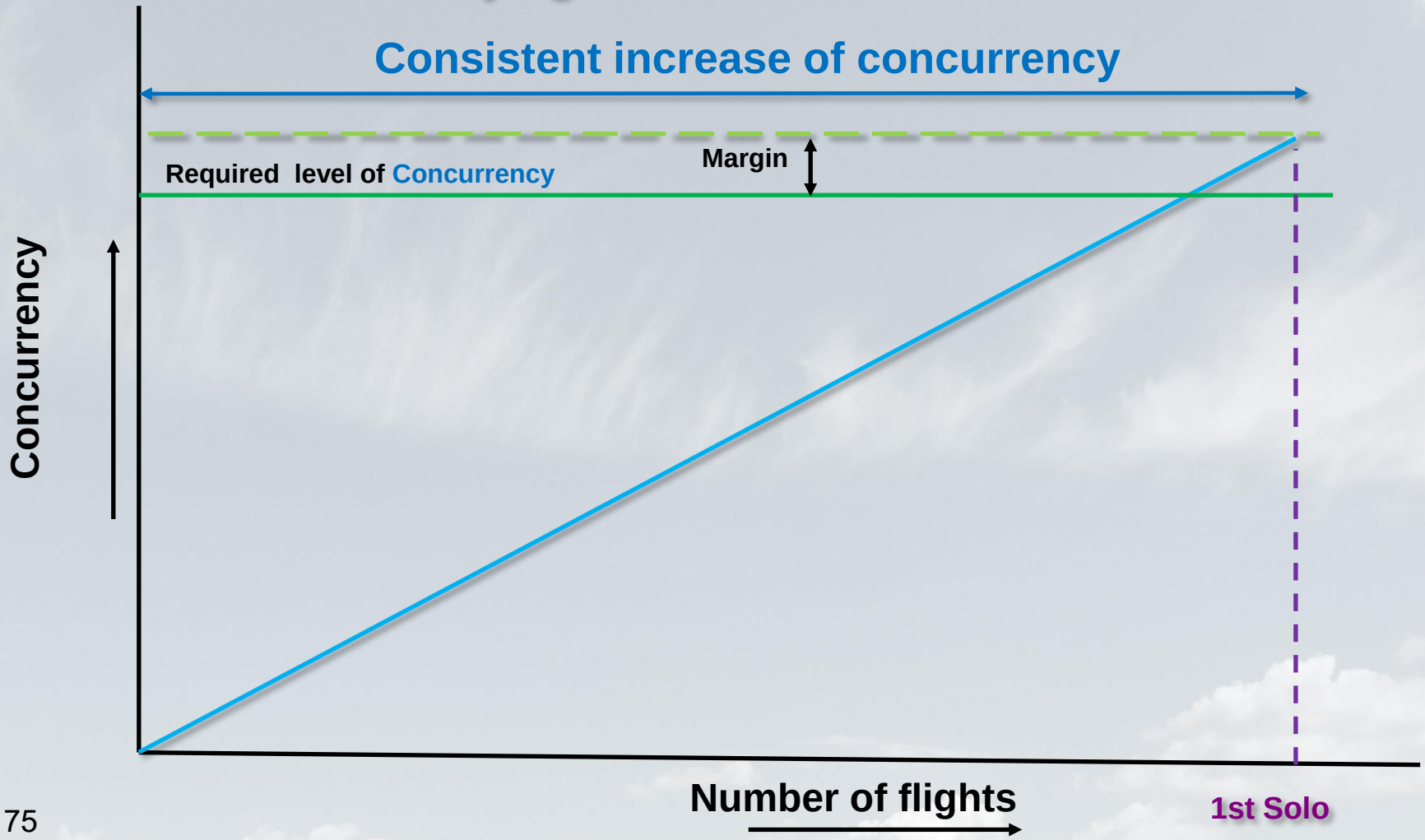
5 How do I feel

13

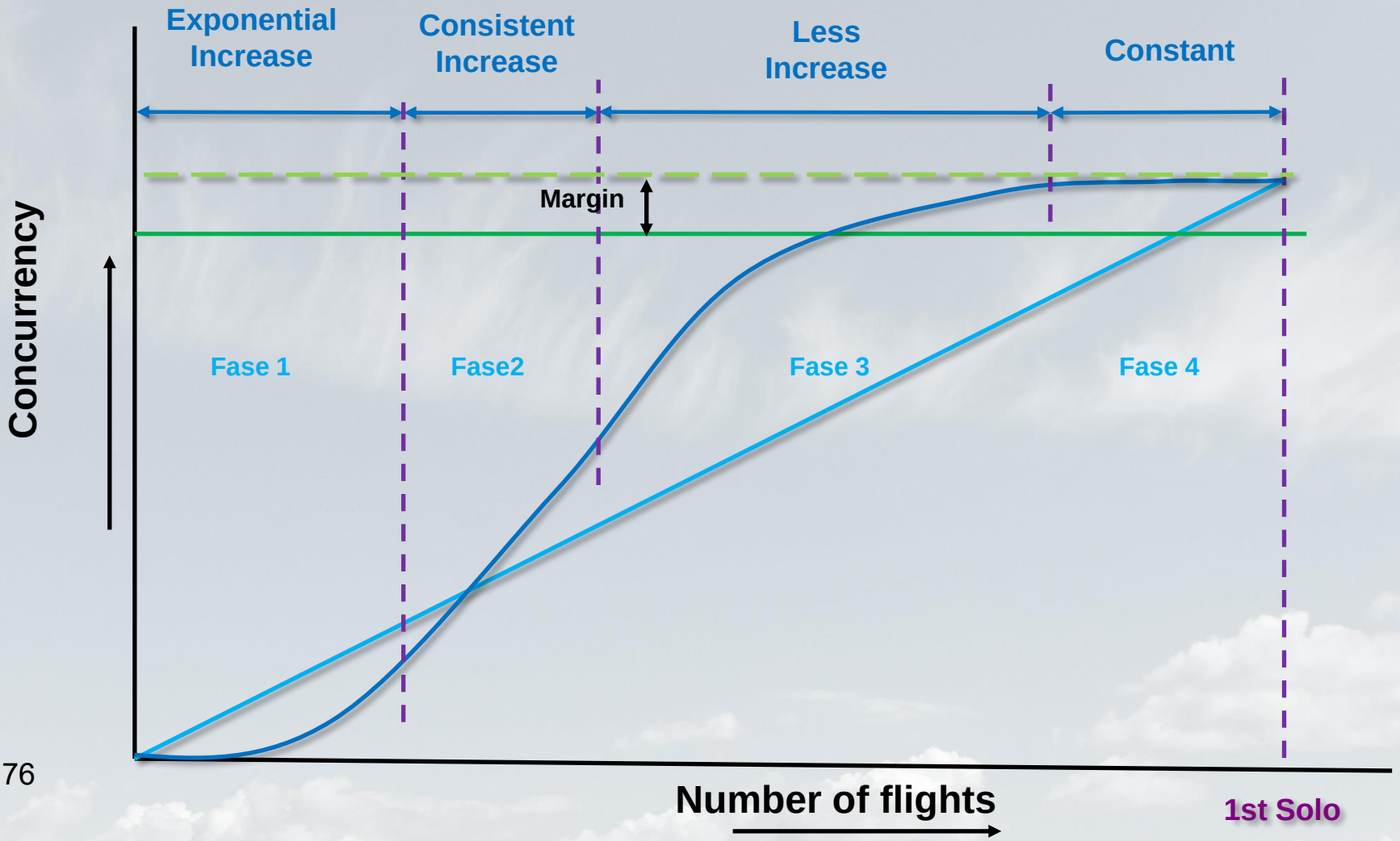
Concurrency

Concurrency

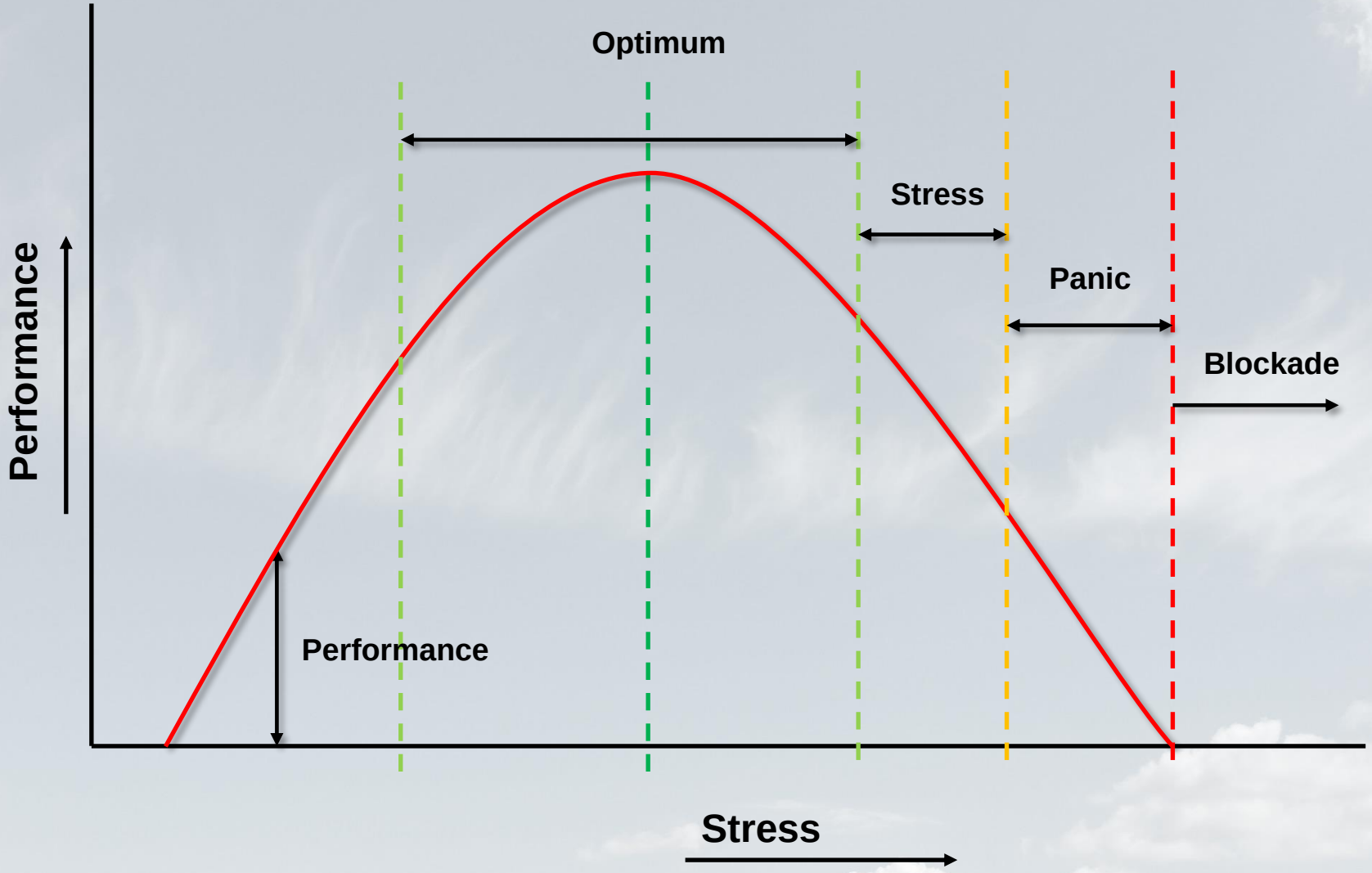
The extend to which the student can handle multiple aspects of flying at the same time



Development ofConcurrency



Stress and Performance



14

Simulations

Purpose of Simulations

To teach the student to recognize and deal with deviations from standard situations

Types of Deviations

Malfunctions

Malfunctioning Systems

Flying too low / far

Cable break

Instruments

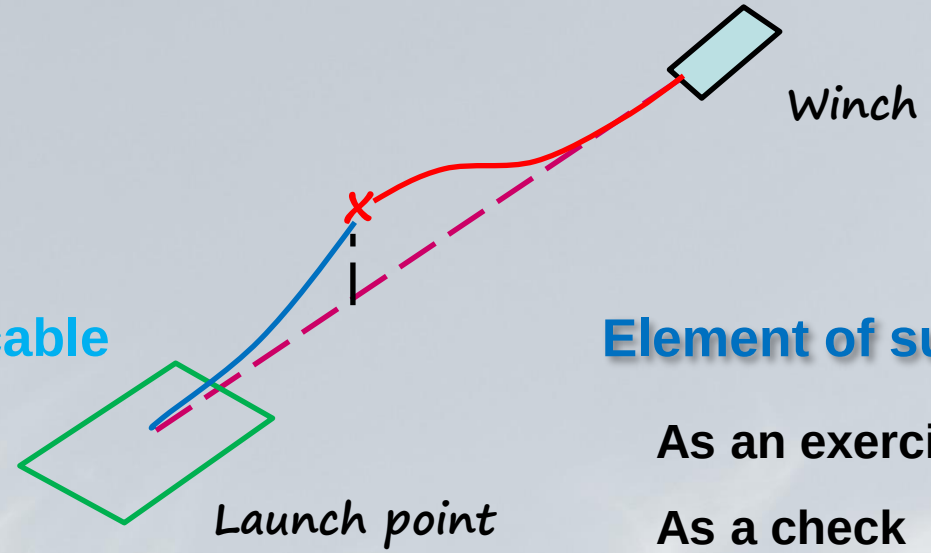
Drifting away in a Thermal

Airbrakes

Far from the High Key Point

Cable break:

Below 100 m (300 ft)



Simulation:

Instructor releases the cable

Element of surprise:

As an exercise	0
As a check	+

Danger:

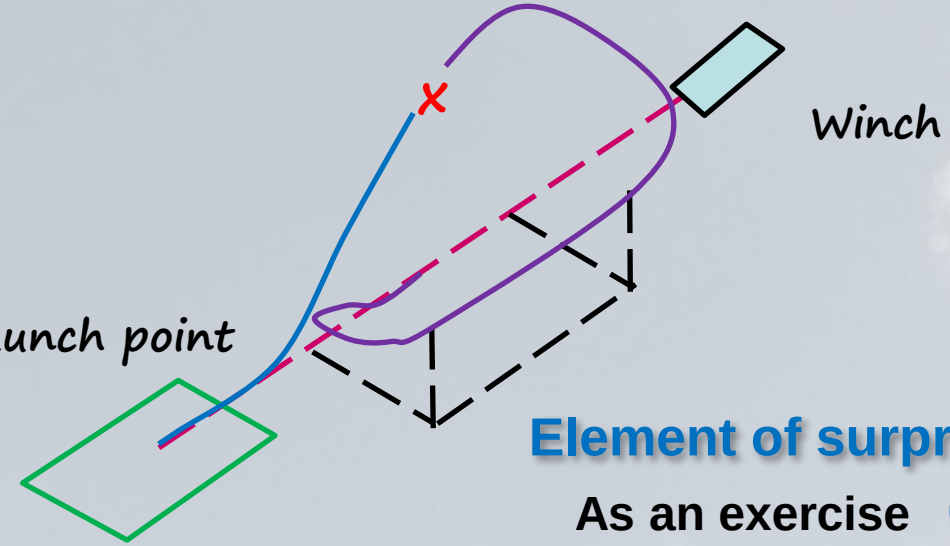
Stall	How quick is the reaction/ Intervention by Instructor
Landing after the winch	How quick is the reaction/ Intervention by Instructor
↘ Shortened Circuit	Intervention by Instructor
Duty Pilot was not informed	Inform the Duty Pilot
Winch operator was not informed	Inform the Winch operator (through the Duty Pilot)

Cable break:

Above 100 m (300 ft)

Simulation:

Instructor releases the cable



Element of surprise:

As an exercise **0**

As a check **+**

Danger:

Stall — **How quick is the reaction / Intervention by Instructor**

No Shortened Circuit — **How quick is the reaction / Intervention by Instructor**

Flying the Standard Circuit — **How quick is the reaction / Intervention by Instructor**

Shortened Circuit but turn too late — **How quick is the reaction / Intervention by Instructor**

Gliders in the Circuit — **Before takeoff consultation with the Duty Pilot**

Duty Pilot was not informed — **Inform Duty Pilot**

Winch operator was not informed — **Inform winch operator (through Duty Pilot)**

Instruments malfunction:

Simulation:

Instruments are covered

Element of surprise:

As an exercise **0**

As a check check **0**

Danger

Airspeed: too low / too high

How quick is the eaction / intervention by Instructor

Altitude: too low / too high

How quick is the reaction / intervention by Instructor

Airbrake's malfunction:

Simulation:

Keep airbrakes closed

Side-Slip only above 10 m (30 ft)

Element of surprise:

As an exercise **0**

As a check check **0**

Danger:

Too high on Final — How quick is the reaction / Intervention by Instructor

Too low on Final — How quick is the reaction / Intervention by Instructor

Too Low: Drifting away in a Thermal

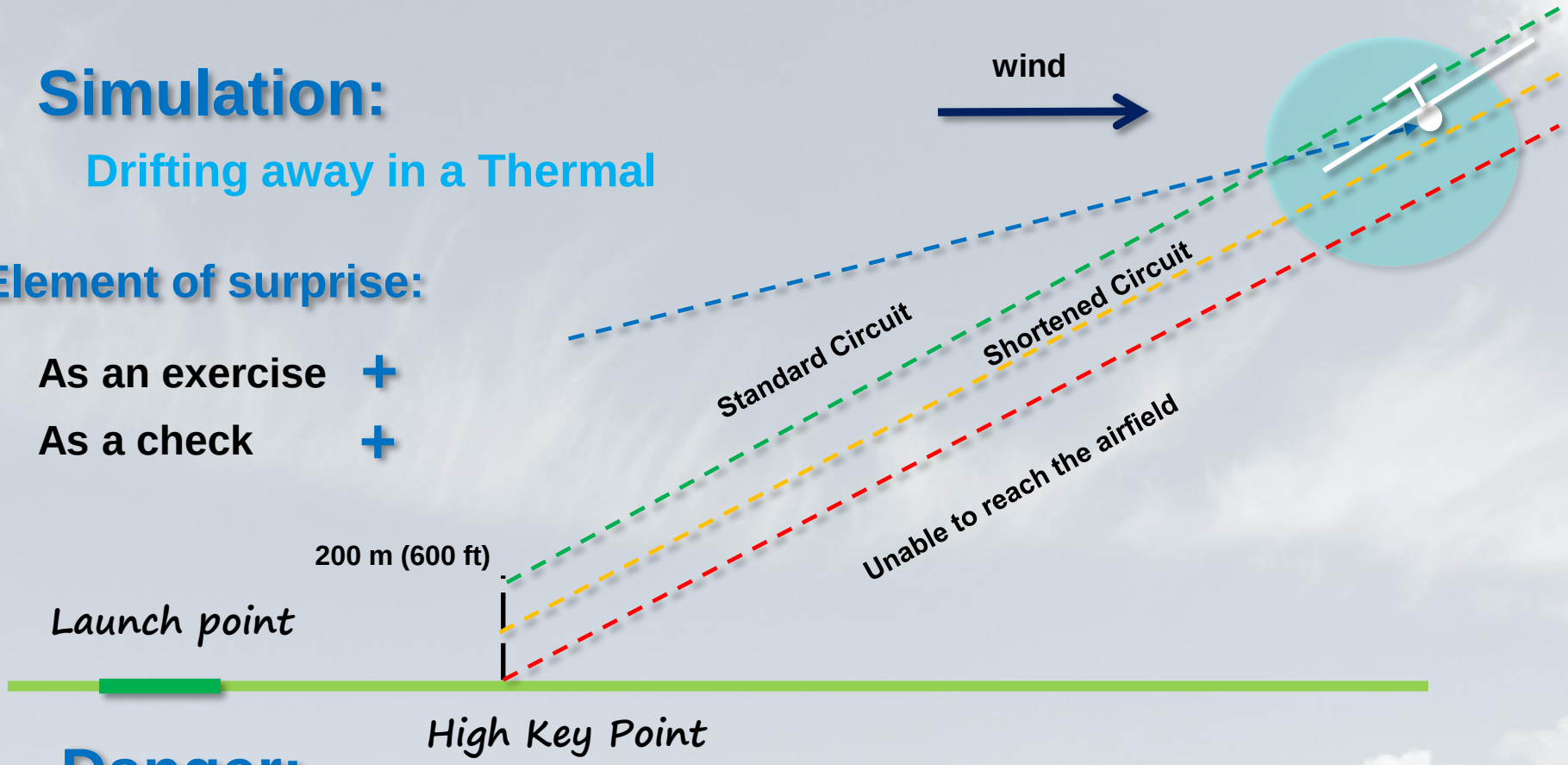
Simulation:

Drifting away in a Thermal

Element of surprise:

As an exercise +

As a check +



Danger:

Still thinks a shortened circuit can be flown

How much margin

Too low: Too far from the airfield

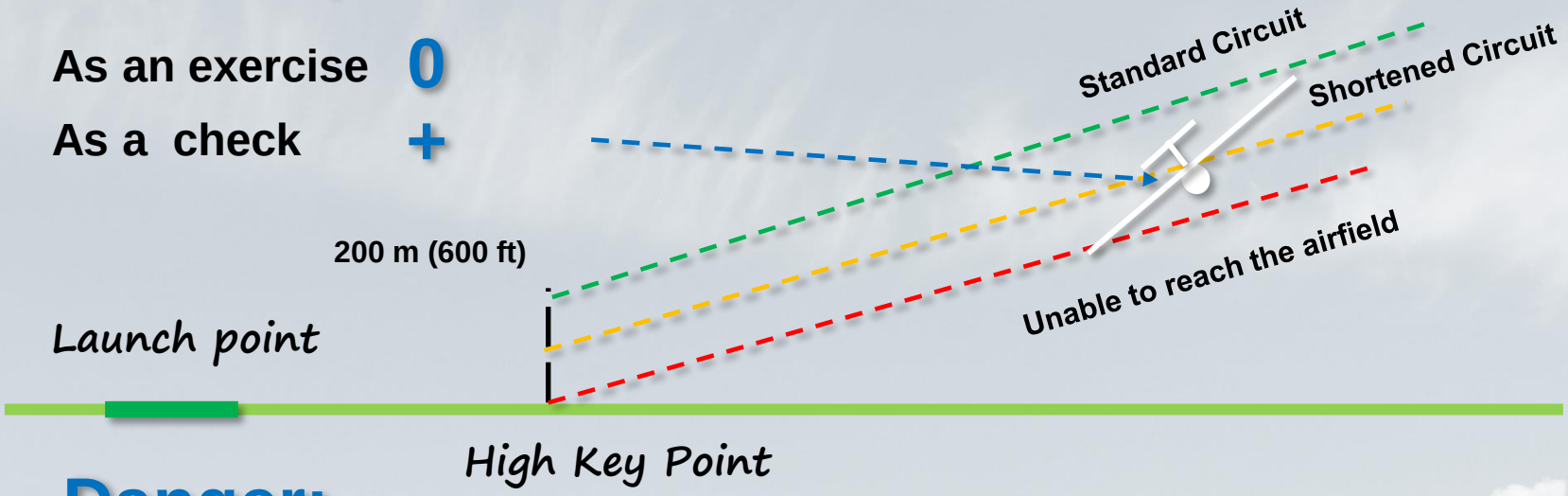
Simulation:

Let the student fly away from the field

Element of surprise:

As an exercise 0

As a check +



Danger:

Still thinks a shortened circuit can be flown

How much margin

15

Procedures: Follow or Deviate

How to teach the student when to Follow and when to Deviate

Follow in order to follow:

Cockpit check

Cable release check

Downwind check

Checklist

Follow in order to (if necessary) deviate:

Circuit

Follow Procedures:

Cockpit check

Checklist

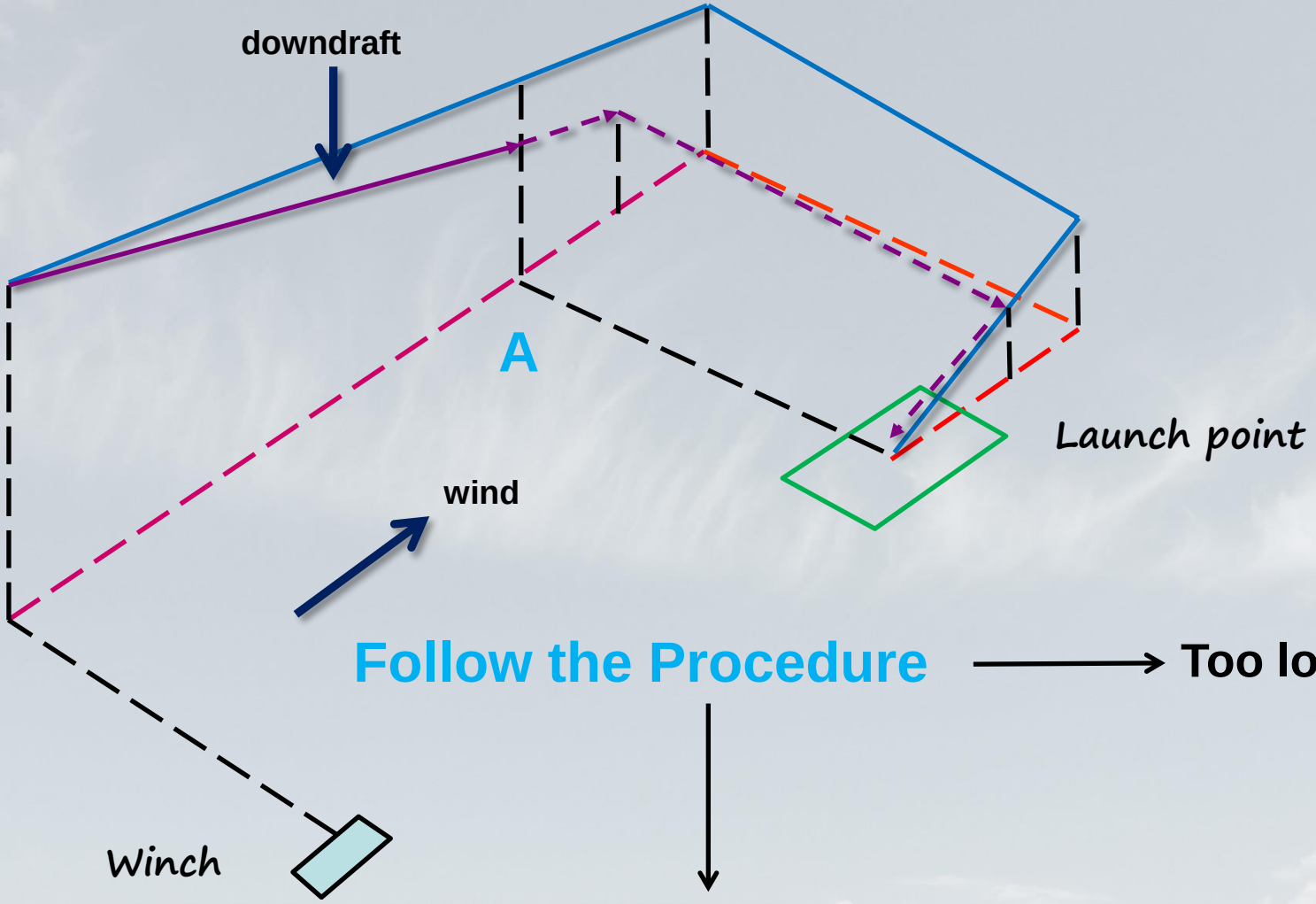
Cable release check

Downwind check

Fixed order (avoids forgetting items)

Easy to remember

Follow procedures to know when to deviate:



Follow the Procedure → **Too low at point A**

Deviate from the Procedure → **Turn earlier to base leg**

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