

Chicagoland Glider Council

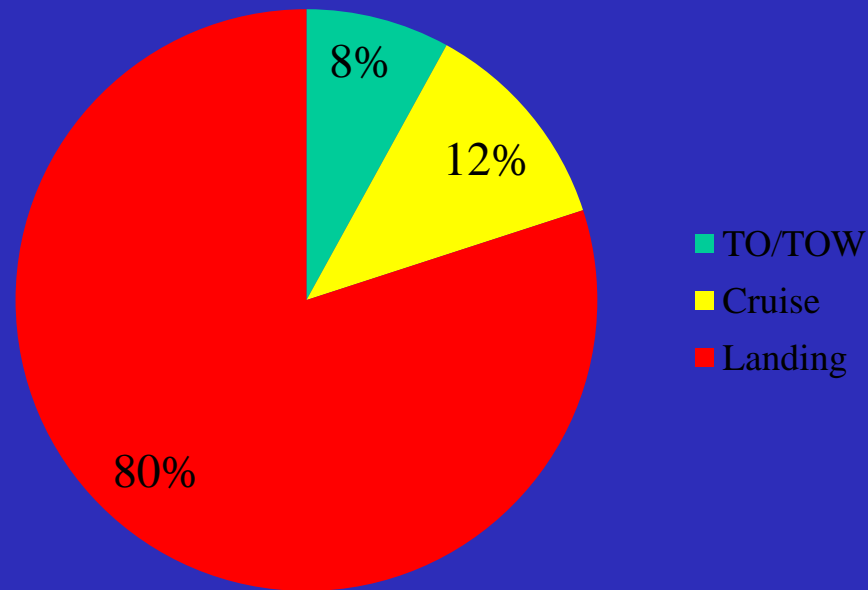
Approaches and Landings

February 9, 2016

Presented by Jeff Mack, CFGP

CFIT & The Traffic Pattern

A look at the accident statistics



Approach & Landing

- The Basics
 - Reach the IP at xxxx ft AGL
 - Complete the landing checklist
 - Enter the downwind leg and correct for x-wind
 - Opposite touchdown point
 - Turn Base 45 degrees from touchdown point
 - Turn Final and aim for T.D. point
 - Use spoilers to control glide path, elevator to control speed

Approach and Landing

- The Basics with some applied ADM
 - Pick your touchdown point on/off the runway
 - Determine where entry point will be given current situation (altitude, position, and speed)
 - Determine where downwind/base turn must be
 - Determine where base/final turn must be
 - Complete landing checklist prior to landing

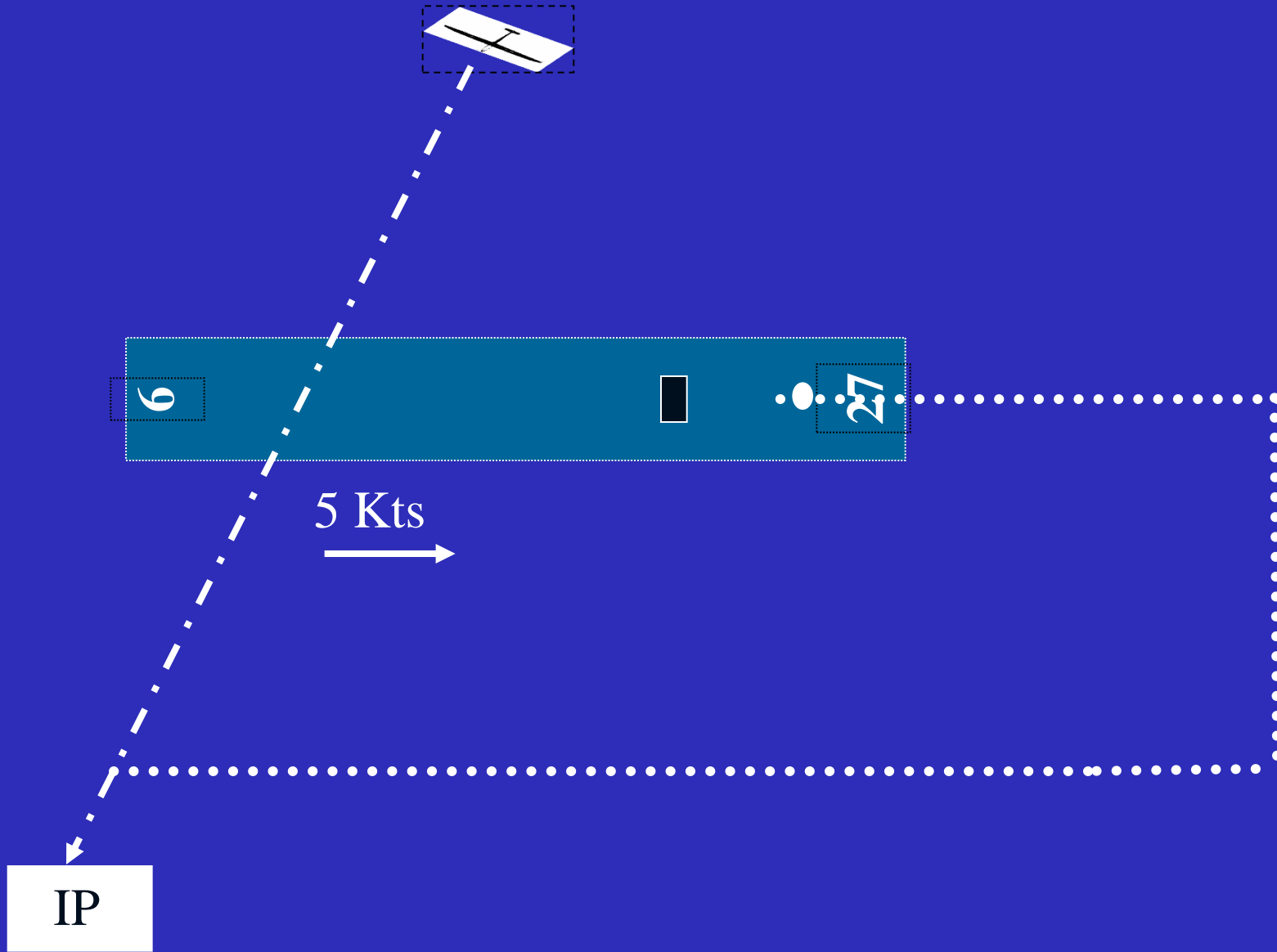
Adding in RM skills

- What factors will effect the airspeed on this landing?
- What factors will effect the gliders height and position on this landing?
- What actions would be required if conditions change?

Maintaining Situational Awareness

- **As it relates to operating a glider, situational awareness elements include:**
- **Knowing wind speed and direction**
- **Maintaining awareness of height/position required to reach a safe landing area.**
- **Thinking ahead.**
- **Keeping a mental picture of the location of other traffic and the possibility of wake turbulence.**
- **Maintaining awareness of physical obstructions such as trees, wires, structures, potential for windshear and lee turbulence, etc.**
- **Keeping a “safe angle” (especially when in the traffic pattern).**

Goal is IP point



Approach & Landing

- Major drawback is that primary focus is on reaching the IP.
- This technique works well when you plan ahead to reach the IP at the desired altitude.
- What happens when this planning breaks down and you find yourself 1 mile out at 1200 ft and runs into 500 fpm sink? Or if you are landing out and there's no "red barn?"

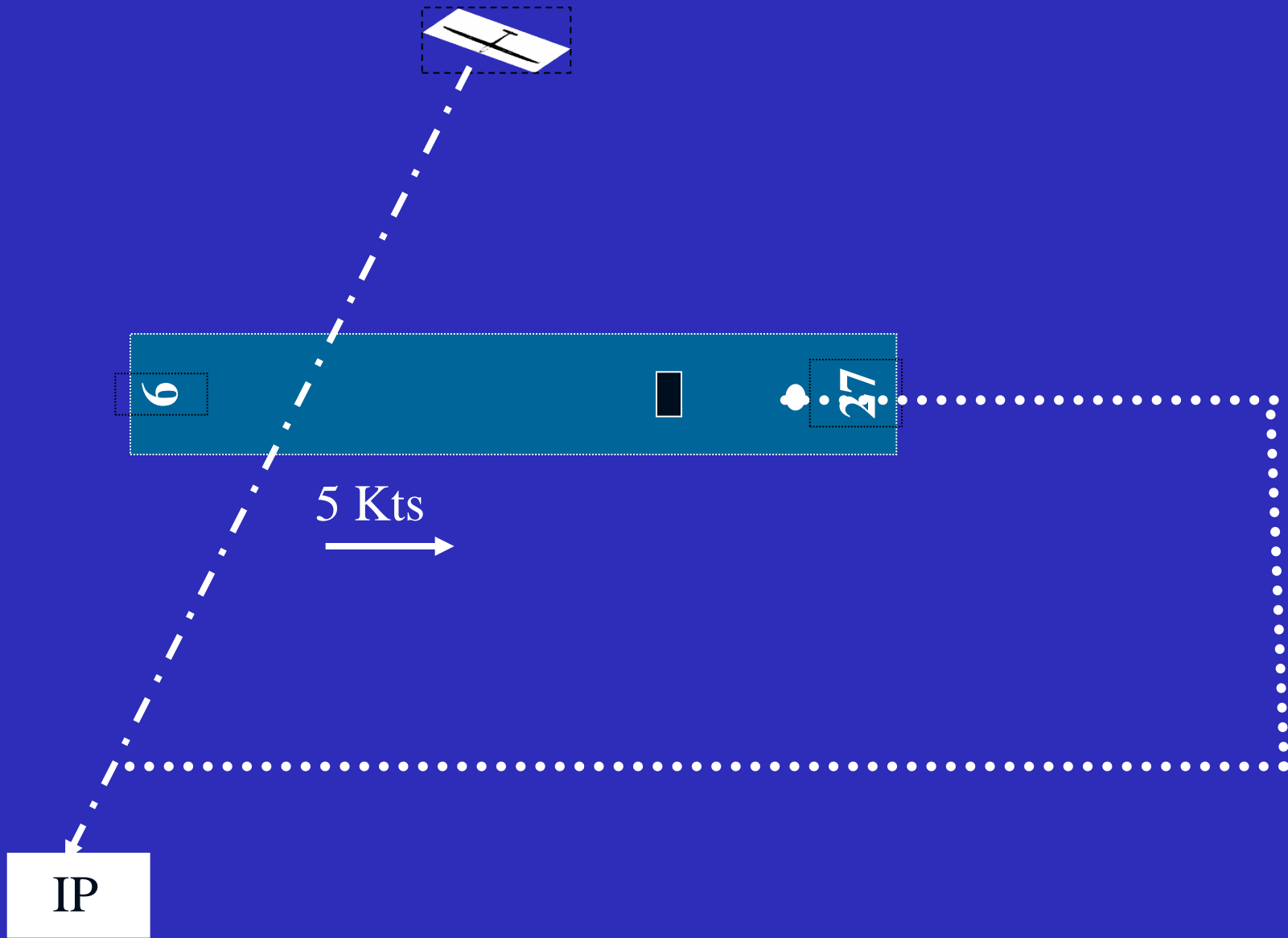
Choose Your Approach



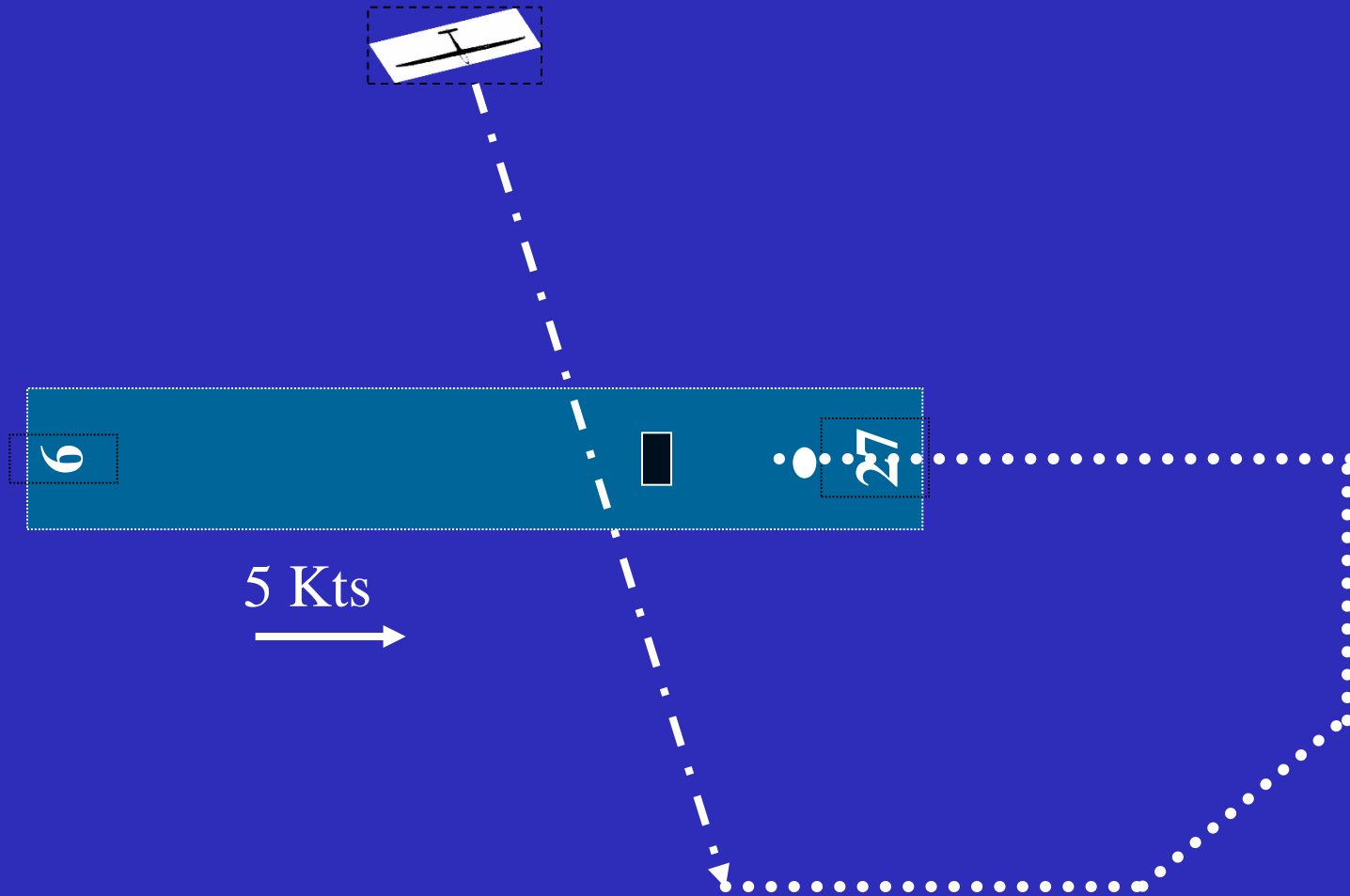
Goal is Touchdown Point?



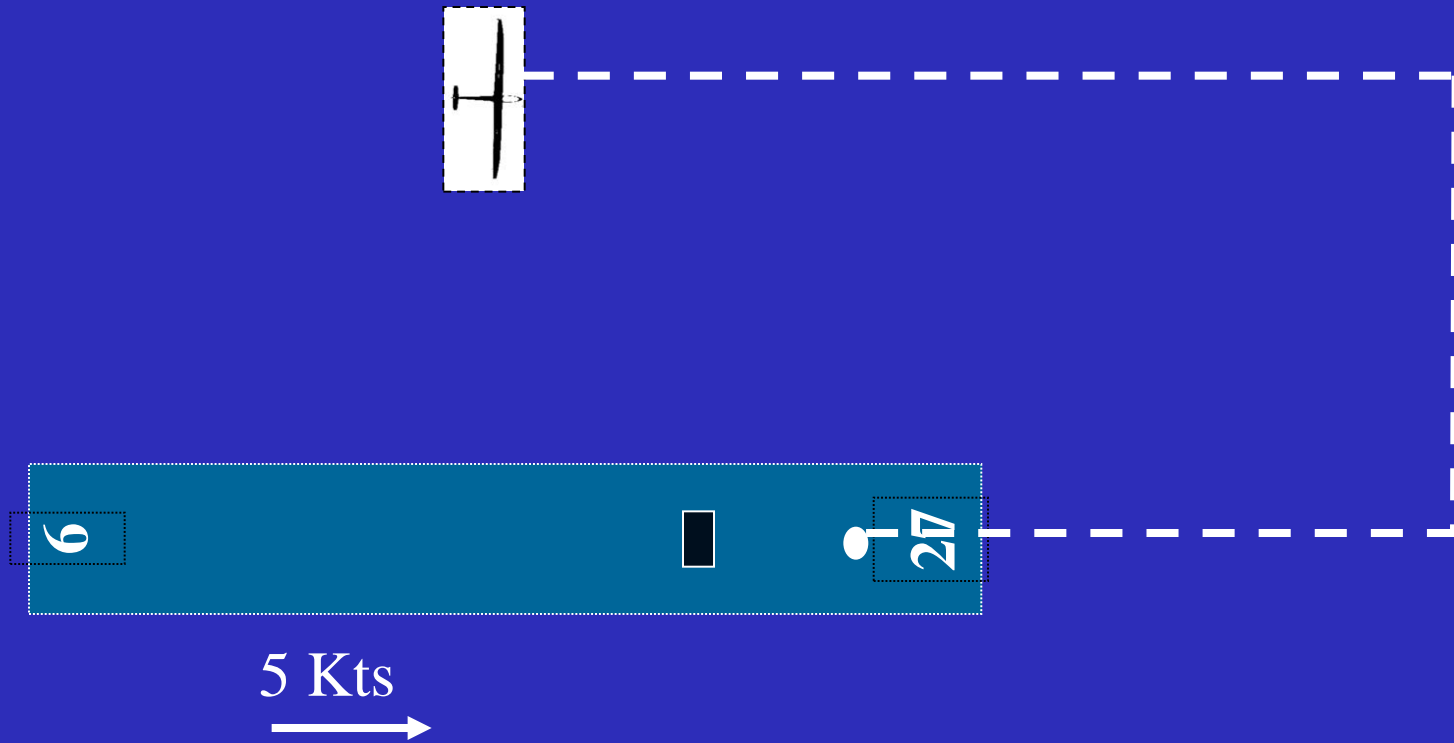
Goal is Touchdown Point



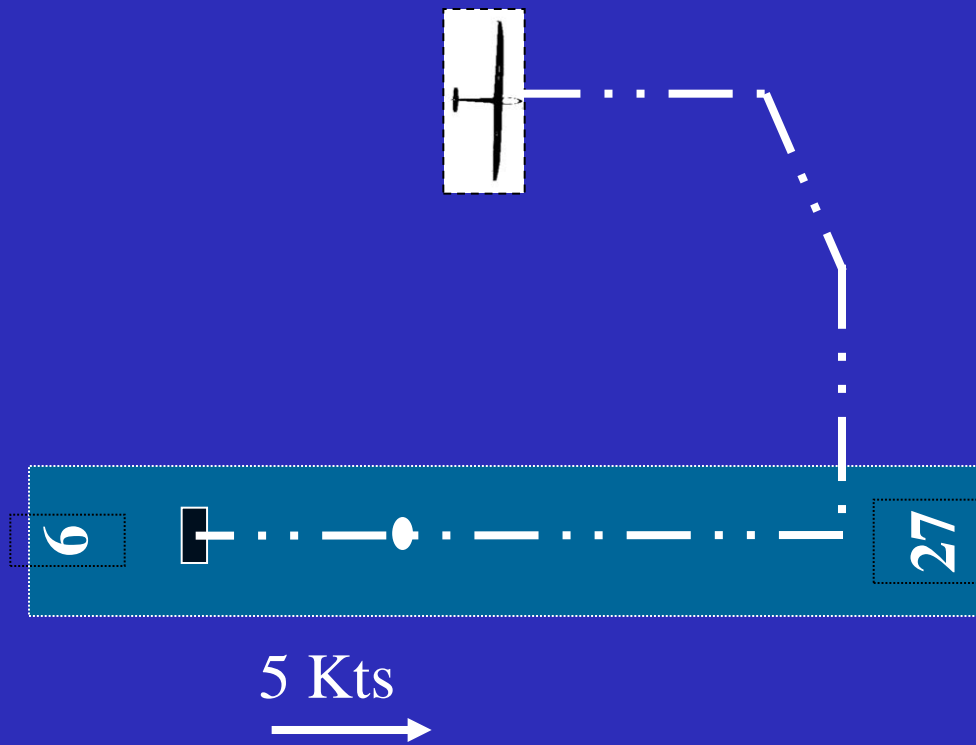
Optional Approach 2



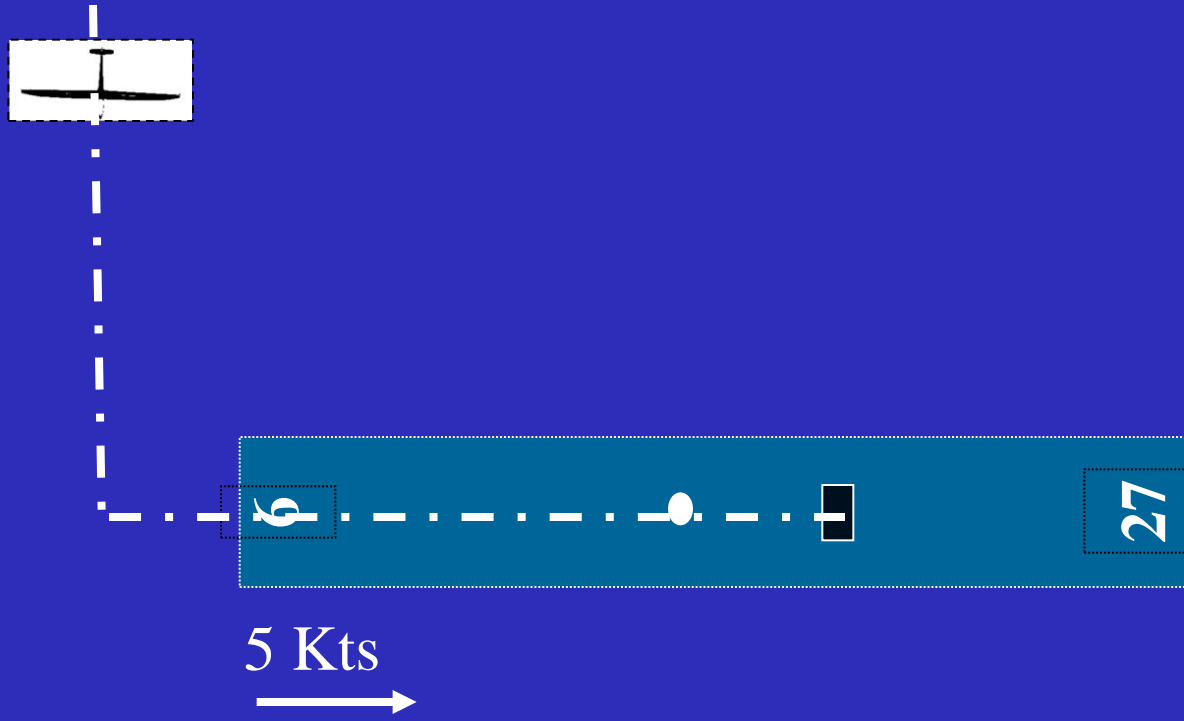
Optional Approach 3



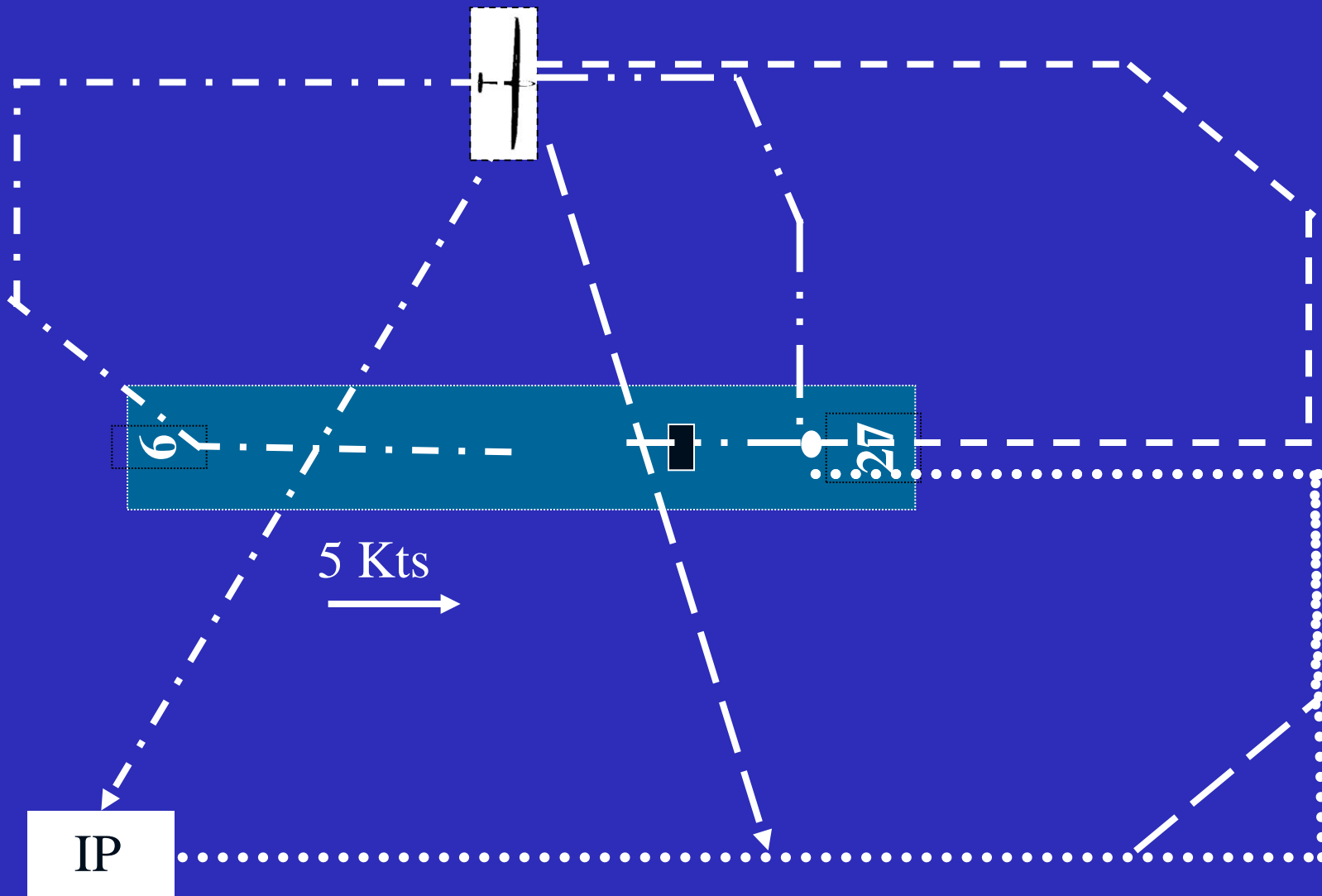
Optional Approach 4



Optional Approach 5



Which Approach should I use?



Practicing Goal Oriented Approaches

- Practice arrival from various directions
- Practice left, right, straight-in, downwind approaches
- Practice arrival from various altitudes
- Consider the effect of constant headwind
- Consider the effect of a decreasing headwind

A Goal Orientated Approach

- Focus on the landing area
- Practice ‘standard’ and ‘non-standard’ approaches
 - 1st approach ‘standard’
 - 2nd approach ‘non-standard’, overhead join at mid-field
 - 3rd approach ‘non-standard’, right vs left pattern
 - 4th approach ‘non-standard’, abbreviated right vs left pattern
 - 5th approach ‘non-standard’, base/final only
- Use your checklist
- Maintain safe airspeed ($1.5 \times V_{S0}$) minimum
- Conserve energy
- Always fly safe, coordinated turns. Don’t “cheat” the turn to final with the rudder!

Making it work

What is TLAR?

How is it applied?

Choosing an angle which is safe means the glider has sufficient energy to safely complete the pattern, absent catastrophic sink.

TLAR in the Pattern

Do you find it easy to judge an angle – say 30 degrees?

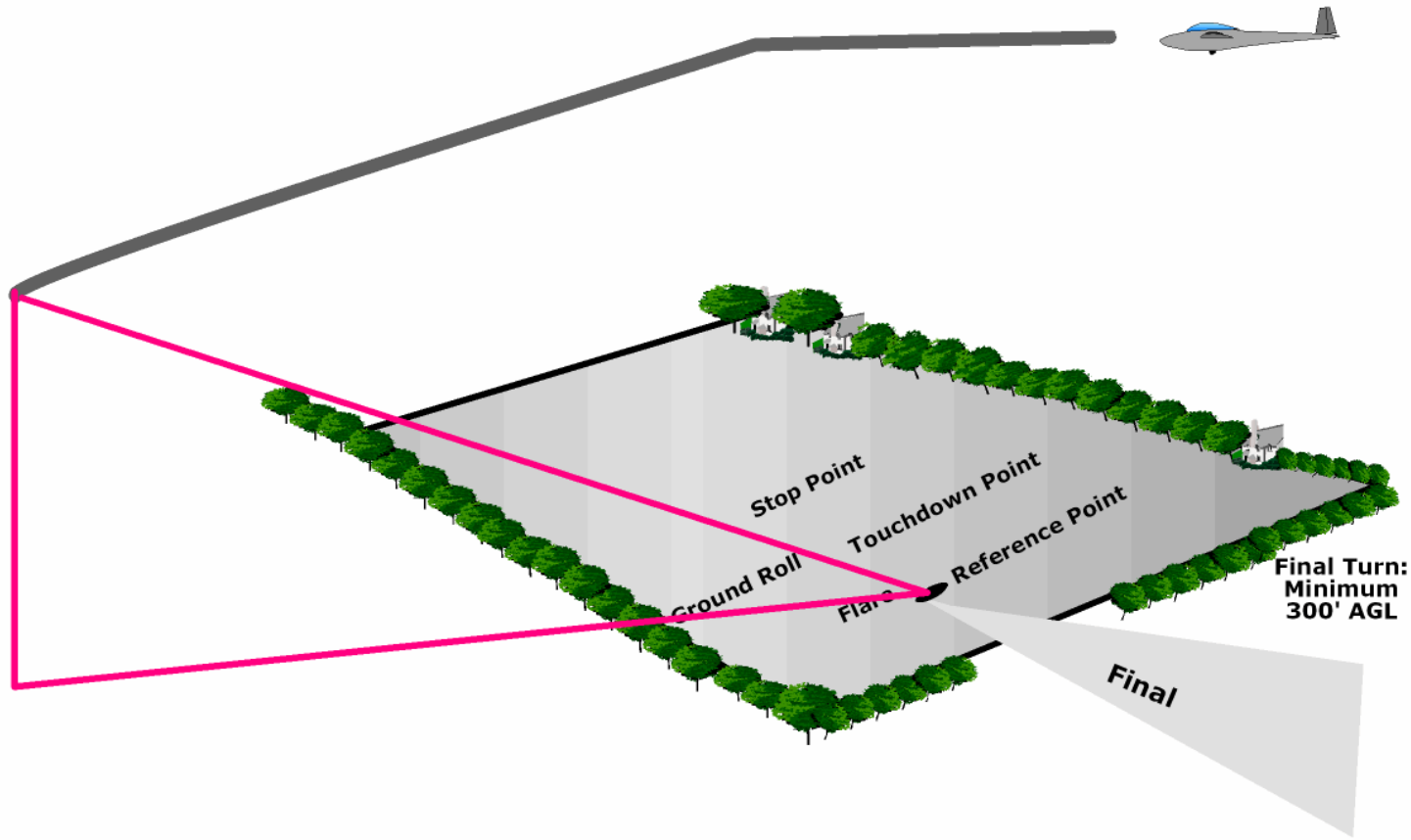
Can you easily perceive when an angle changes?

Can the ability to see instantly an angle which is changing help us as pilots?

TLAR in Pattern

The dip angle is the Angle between (1) an imaginary line drawn from the pilot's eye to a chosen point on the surface and (2) an imaginary horizontal line drawn from the same chosen point on the surface to the point on the surface which is directly below the glider.

The prime example for flying the pattern is the dip Angle to the aiming, or Reference, point on the ground – for example, the numbers at the end of the runway – where the pilot will look on final approach.



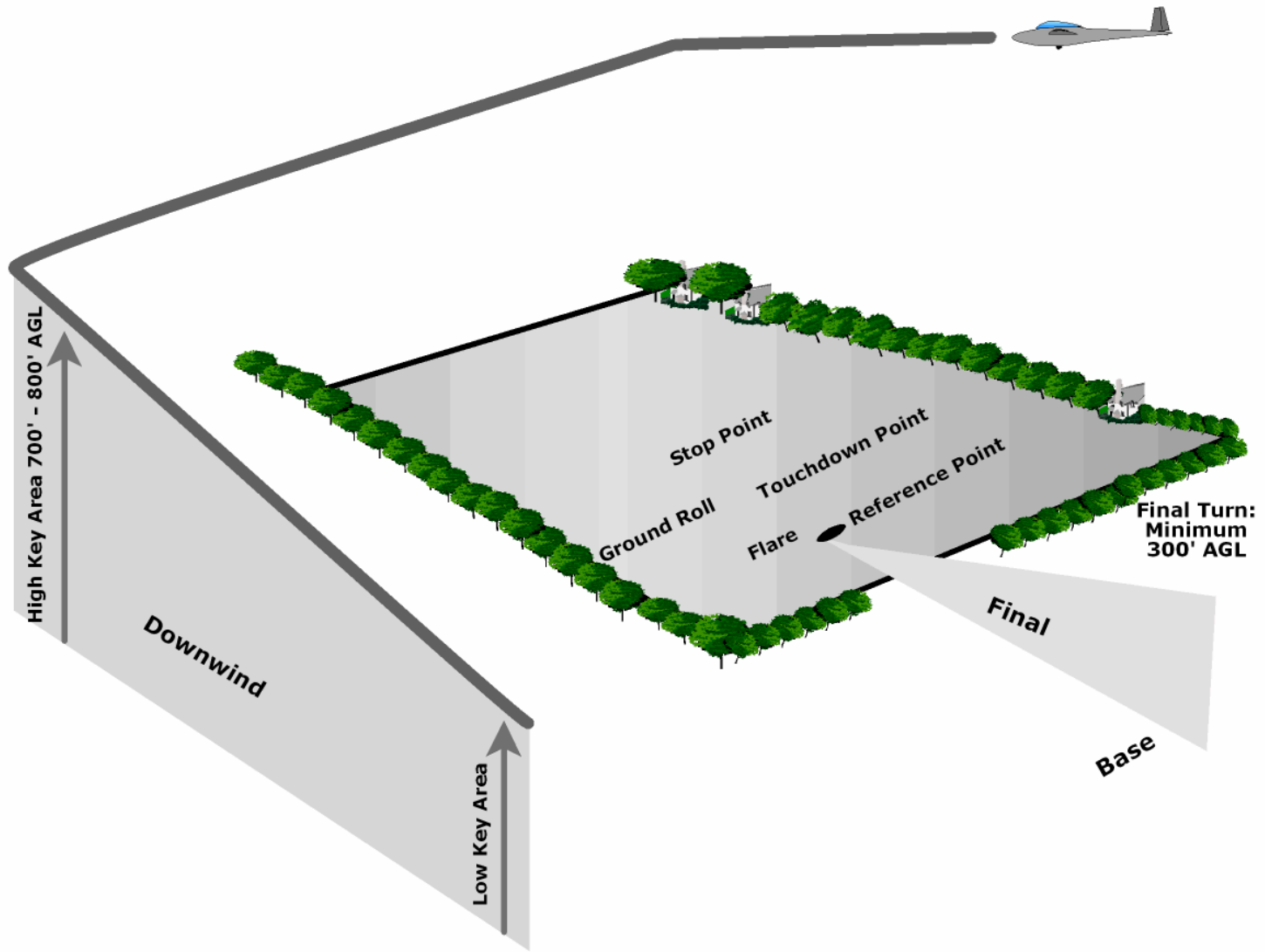
TLAR in Pattern

Let's look and see how the Angle changes as the glider flies downwind, parallel to the runway, assuming still air – no lift or sink.

If the glider maintained height on downwind, the Angle would increase as the glider gets closer to the Reference Point.

But the glider is descending, and the descent cancels out the increase.

So, as the glider flies downwind parallel to the runway, the ANGLE REMAINS CONSTANT.



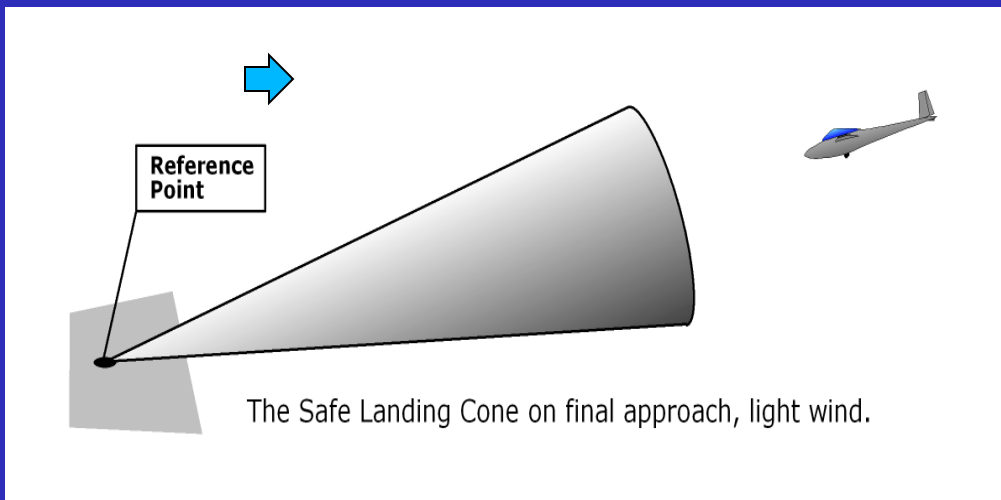
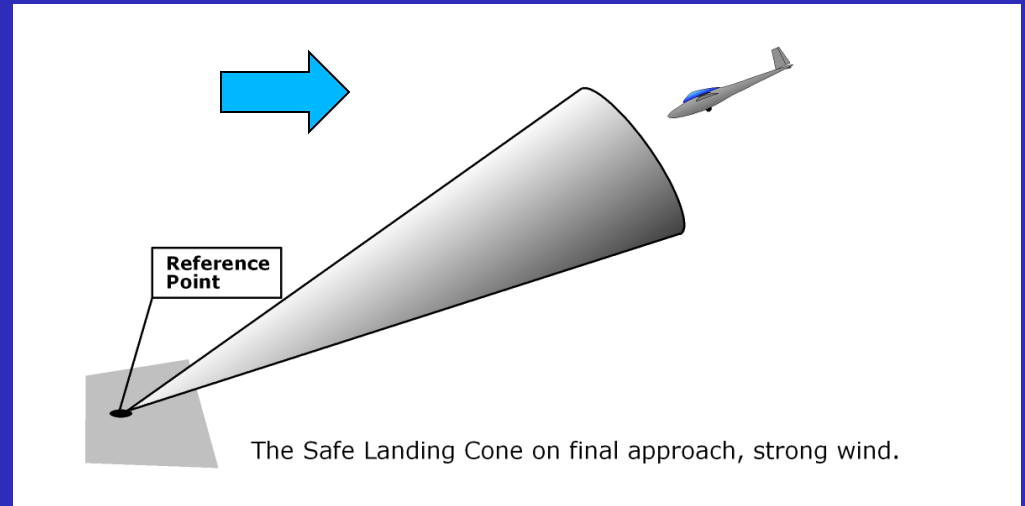
TLAR in Pattern

How can this information be applied to avoid CFIT in the pattern – failing to make it to the Reference Point and landing/crashing short?

As the glider is flying back toward the field, pick a safe Angle.

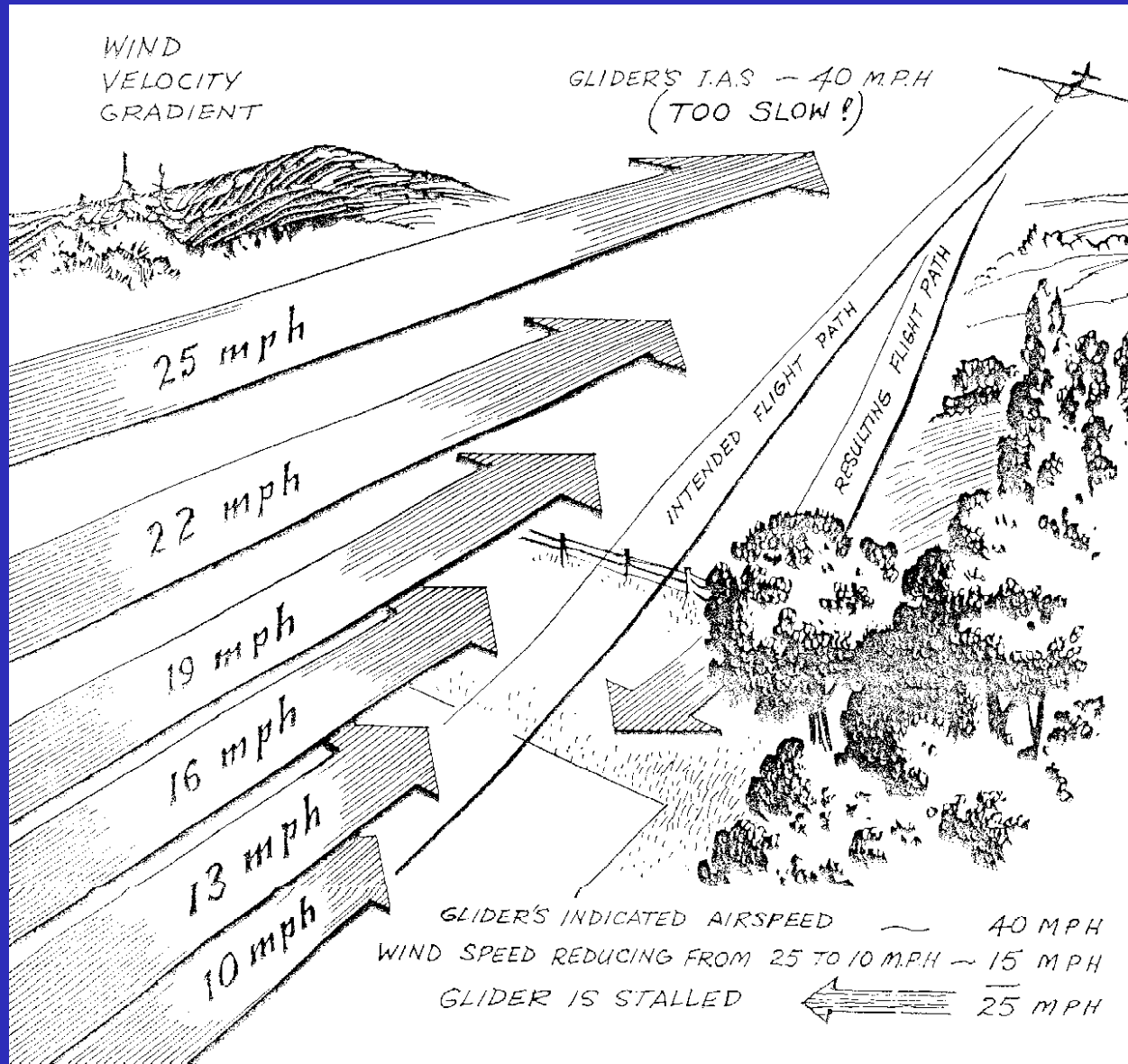
The Angle will be less steep in a higher performance glider e.g. a Grob G 103, than it would be in a lower performance glider like a 2-33.

The Angle should be steeper if the wind is stronger.



What does it look like with a tailwind?

Wind Gradient



Energy Management

- It all comes down to managing your energy
- Two types of energy
 - Potential (Altitude)
 - Kinetic (Airspeed)
- How much do you need? It depends...
 - Wind conditions
 - Wind shear
 - Terrain/obstructions
 - Length of landing area
 - Glider performance

How do we manage it?

- Plan for this loss of energy
 - Pick an approach speed that will allow for some loss
 - Move base leg closer to runway edge
 - Be higher turning Final
 - Be prepared to close the spoilers
 - Be prepared to pitch forward to maintain/recover airspeed

What are people really doing?

2002 Std Class Nationals

<http://soaring.aerobatics.ws/LOGS/HomePage.html>

12 Pilot's Landing Traces

Tom Beltz

Walter Cannon

Bob Epp

Chip Garner

Ray Gimmey

Sam Gitner

Gary Itner

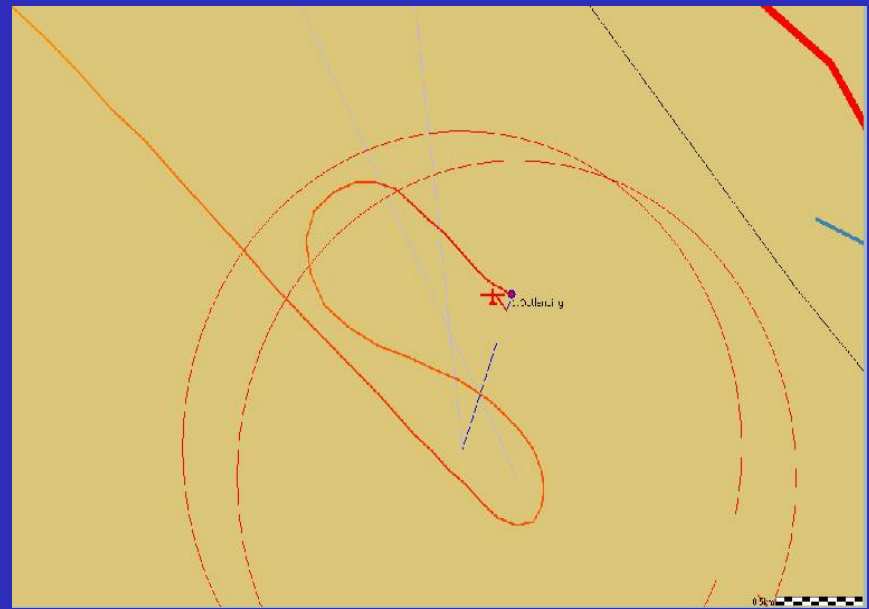
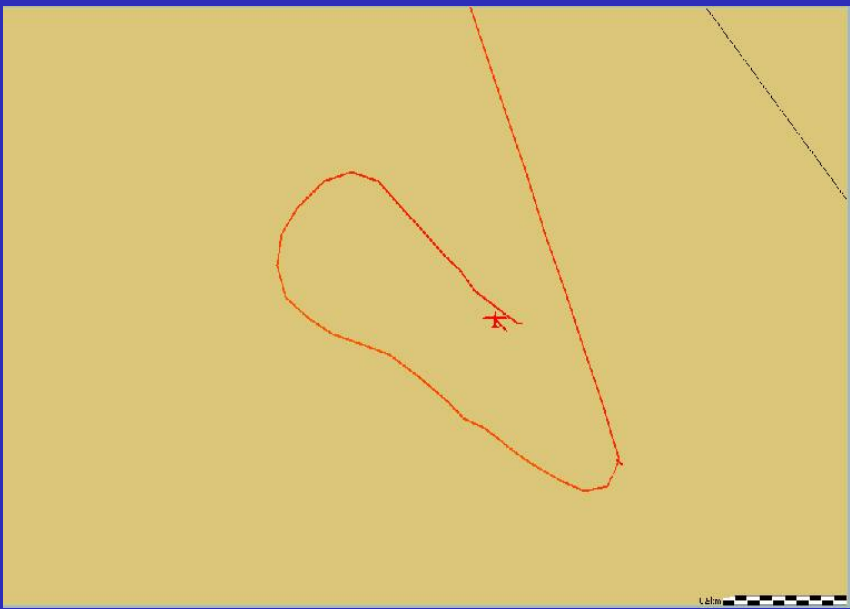
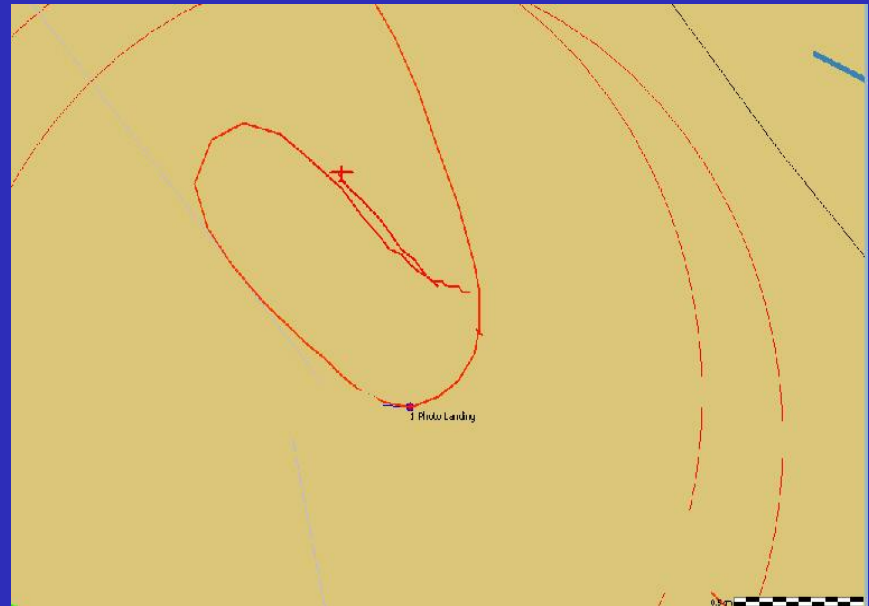
Tom Knauff

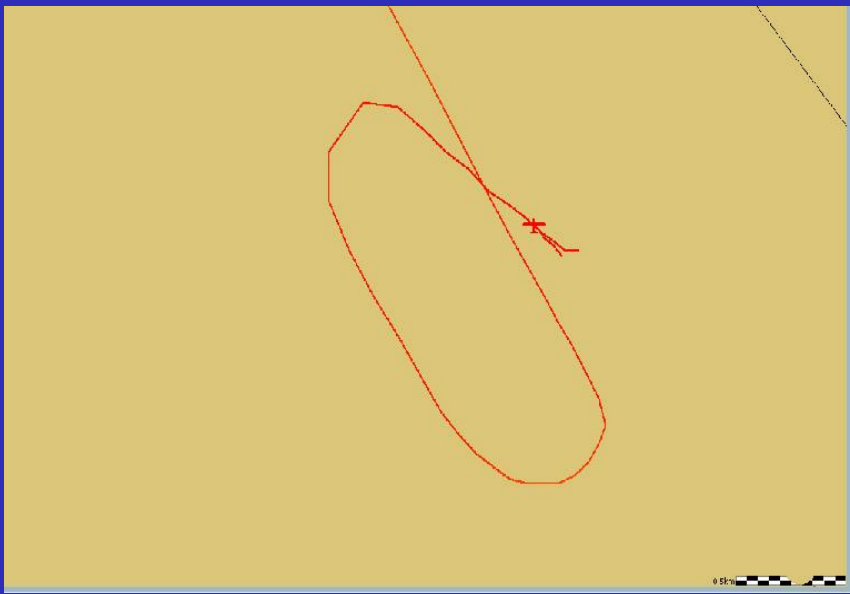
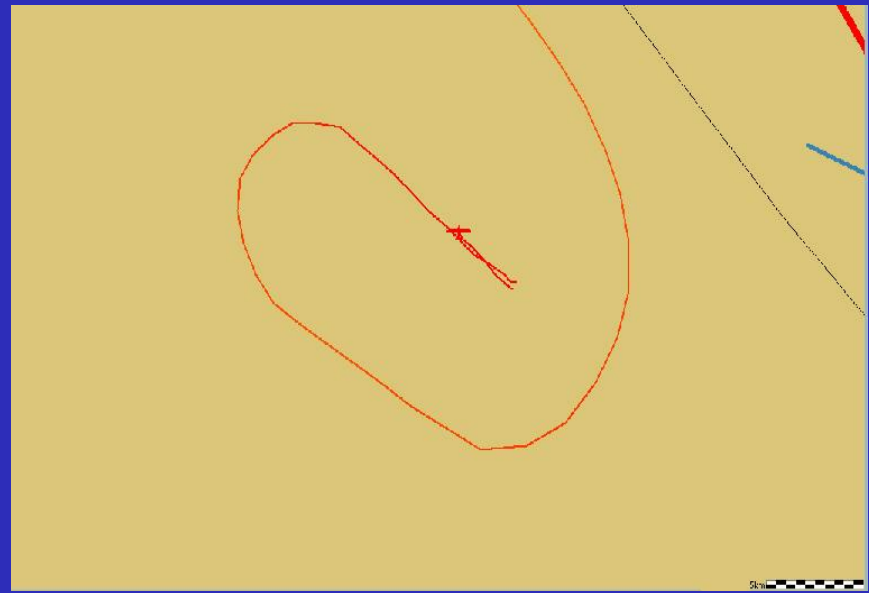
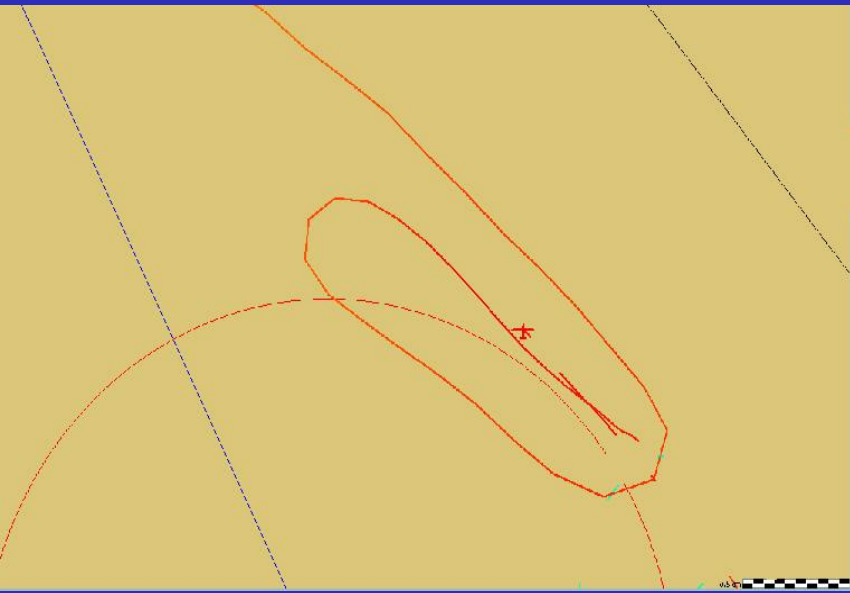
Baudouin Litt

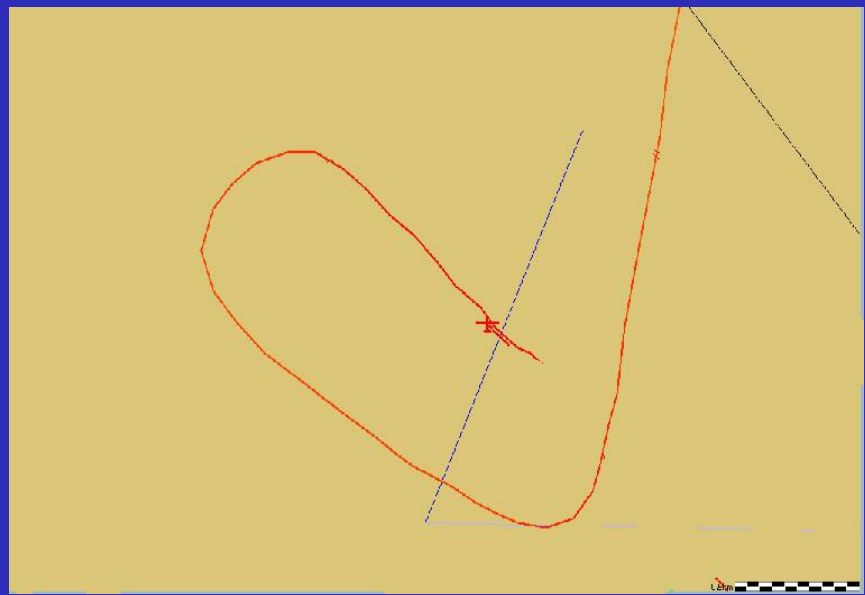
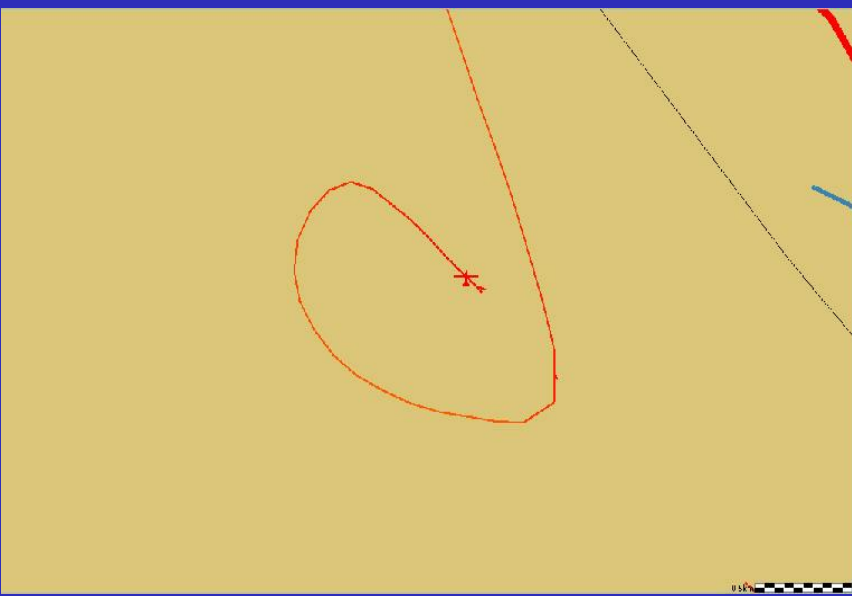
Liz Schwendler

Ken Sorenson

Tim Wells







Landing Scenario 1

- 1 mile North of field @ 700 AGL
- Tow plane in pattern for 27
- Glider in pattern for 9
 - What could the pilot do
 - What are the risks and how are they changing
 - What are the potential risk mitigation strategies
 - What are the pro's and con's for each potential action

Landing Scenario 2

- Rolling out on Final for 27
- Glider is towed into touchdown area
 - What could the pilot do
 - What are the risks and how are they changing
 - What are the potential risk mitigation strategies
 - What are the pro's and cons for each potential action

Landing Scenario 3

- Passenger getting sick – need to expedite landing.
- 2 miles NE @ 2,500 AGL
- Winds 10-15 from the west
 - What could the pilot do
 - What are the risks and how are they changing
 - What are the potential risk mitigation strategies
 - What are the pro's and cons for each potential action

Conclusions

- A review of glider accident statistics shows that two-thirds of the accidents occur in the landing phase of flight.
- Maintain situational awareness.
- Think ahead.
- Conserve energy to expand your options.
- Practice, practice, practice!
- Strive for precision on every approach and landing. Make every landing a precision landing!