

Ten things your Instructor Told you, that you Forgot

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SSF Soaring Safety Foundation



Soaring Safety Foundation

- **The training and safety arm of the SSA**
 - <http://www.soaringsafety.org>
- **Outreach programs**
 - Flight Instructor Refreshed Clinics
 - Site Survey
 - Safety seminar
- **On-line training**
 - Wing Runner
 - Tow Pilot
 - More to come



Glider Flight Safety

Summary of glider accidents (fatal and non-fatal) reported to the NTSB.

Year	2005 (32)	2006 (35)	2007 (42)	2008 (30)	2009 (34)
TO/Tow	3/9%	7/19%	9/20%	7/23%	12/35%
In-Flight	5/15%	5/14%	5/11%	6/20%	6/17%
Landing	20/61%	22/61%	29/67%	16/53%	13/38%
Others	4/12%	2/6%	3/7%	1/3%	3/9%

Midair collisions in 06 & 07 account for discrepancy



What did you Forget?

- The following slides identify 10 topic areas where accidents occur.



Don't Crash!!!

Aeronautical Decision Making (ADM)

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- **FAR 61.97 Aeronautical Knowledge (Private Pilot)**
 - (b)(11) Aeronautical Decision Making and Judgment
 - Also required for other pilot certificates
- **Good decision making is a learned skill, just like the motor skills needed to make a coordinated turn**
- **Implicit and explicit training involved**

ADM – Current Thinking

- **Decisions are based on**
 - **Experience**
 - **Knowledge of multiple facts**
 - **Expected outcome**
 - **Evaluation of changing events**
 - **Known or expected risks**
 - **Known or expected rewards**



ADM Scenario

- You are flying a club glider and you have just been informed that you have 3 minutes left before your hour is up. Descending thru 1300 ft AGL you hear these radio calls:
 - Glider club traffic, 1 India 2 minutes finishing from the NE, glider club
 - Glider club traffic, 9 X-Ray 2 minutes finishing from the N, glider club
 - Glider club traffic, Golf 1 2 minutes finishing from the N, glider club
- What should you do now?



ADM Factors

- Who long/wide is the runway?
- What other landing options are there?
- If you open the spoilers can you safely land before those gliders get here?
- If you just flew through a thermal, can you 'wait them out'?
- How is your club/FBO going to respond if you are late getting back?

Single Pilot Resource Management

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- Grew out of recognition that pilots and crews needed to work together to solve problems
- A clear set of roles and responsibilities is defined for ALL pilots and crew
- Use all available resources when making decisions



SPRM – Glider Operations

- **Individuals the Glider Pilot can use**
 - Pilot, co-Pilot in multi-place glider
 - Fellow club members
 - Ground crew
 - Wing runner
 - Tow Pilot
 - Instructor

SPRM Scenario

- You are the wing runner, the glider is hooked up and slack has been removed and you are leveling the wings when the launch is delayed due to a runway incursion. The glider pilot opens and closes the canopy during this delay. What actions should you take before giving the launch signal?



SPRM Factors

- Pilot/Wing runner communications?
- Confirmation that canopy is close and locked?
- Other traffic?
- Ground traffic really clear of active?

Pre-Launch Checklist

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- **Written checklist to verify aircraft and pilot are ready for launch**
- **Covers essential items**
 - Instruments
 - Flight controls
 - Pilot and passenger safety
 - Emergency planning
- **Add barriers to prevent accidents**



Tools to Improve the Odds

- **Erect multiple barriers to prevent mistakes**
 - **Glider aerotow launch**
 - POH specified, or other written, checklist
 - Limit distractions
 - Knowledgeable wing runner
 - Runway and area beside runway clear
 - Pre-launch briefing of crew
 - Self briefing on emergency plans



Checklist Scenario

- You are giving rides to a group of friends. As you are getting settled in for the 4th launch, the wing runner says “another glider is on downwind”. You expedite this launch so the runway will be clear for that landing. During the ground roll you realize that your shoulder straps are not fastened. What actions to you take?



Checklist Factors

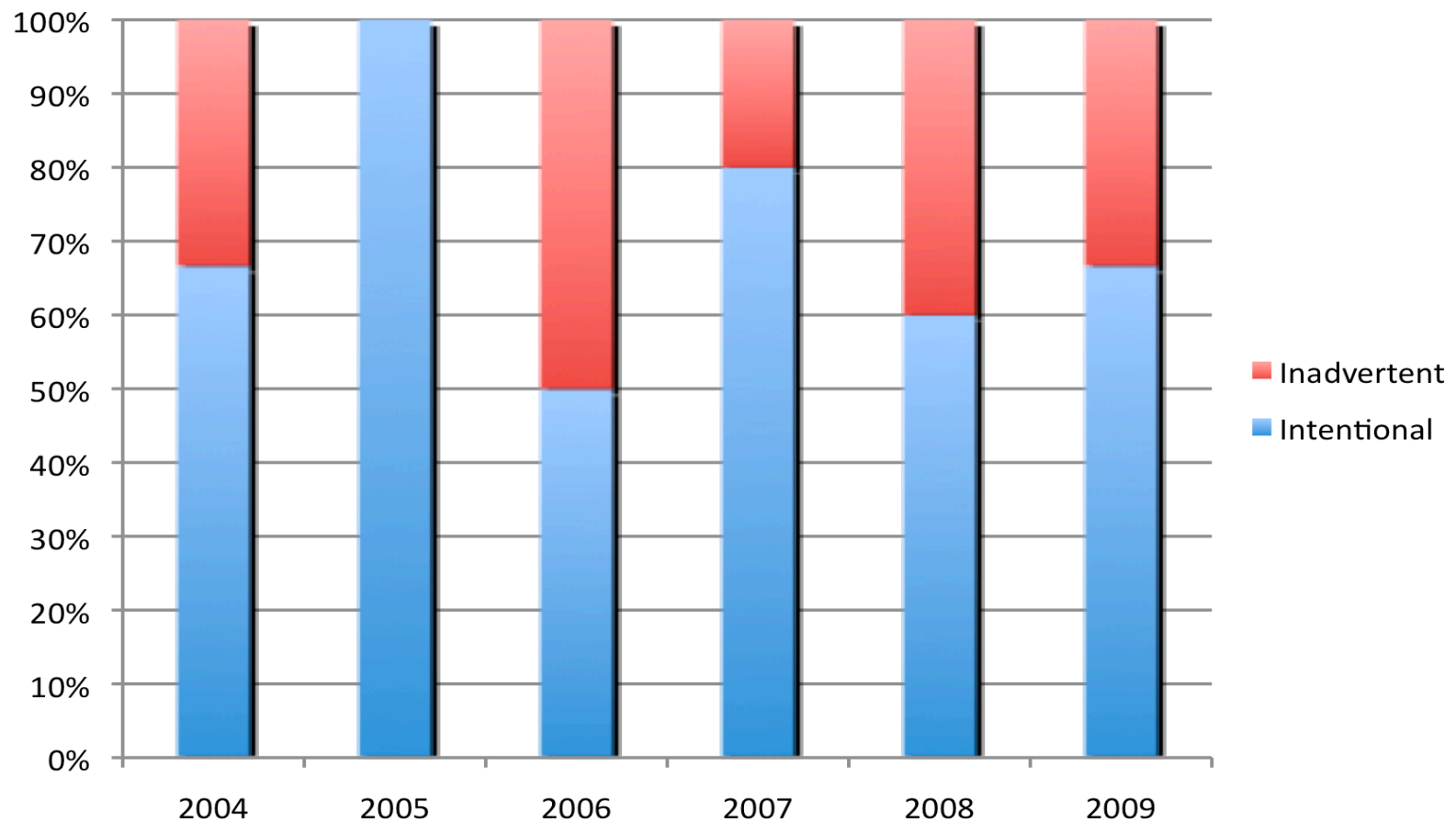
- Checklist item – belts and straps on and secure
- What other checklist items did you miss?
- Is the lap belt secured?
- Can you abort now?
- Where will the landing glider go?
- Where will the tow-plane go?
- What will your friend say if you release?

Premature Termination of the Tow (PT3)

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- For some reason the glider failed to reach the expected release altitude
 - The tow-rope/winch cable broke
 - The towplane/winch failed
 - A mechanical failure of the towhook
 - The pilot intentionally pulled the release
 - and many more...

Inadvertent vs Intentional release





PT3 Scenario

- You and your instructor decide to practice a simulated emergency where you lose sight of the tow-plane during the tow. At an appropriate altitude you will tell your instructor, “I am beginning the simulation”, once the instructor agrees, you will pull the release and complete the pre-planned action.
 - You must pre-determine how you would respond at several different altitudes.
 - You must brief the tow-pilot on this maneuver before launching.



PT3 Factors

- Runway length, wind, weather, density altitude, traffic considerations.
- Possible actions at various stages in the launch (ground roll, 10 ft, 50 ft, 150 ft, 300 ft, ...)
- Where will the glider go?
- Where will the tow-plane go?

Visual scanning

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- The human eye is an excellent motion detector due to peripheral vision
- Once motion is detected, the head/eyes move to bring the object into focus
- A proper scanning technique takes advantage of these biological traits
 - Scan in sectors
 - Stop in sector and allow peripheral vision to capture motion





Visual Scanning Scenario

- You are flying locally and have been up for about 30 minutes. About 4 miles north of the glider club is a VOR, and about 5 miles east of the VOR is a GA airport with a busy flight school that specializes in instrument training. Discuss the precautions you would take when flying just east of this VOR.



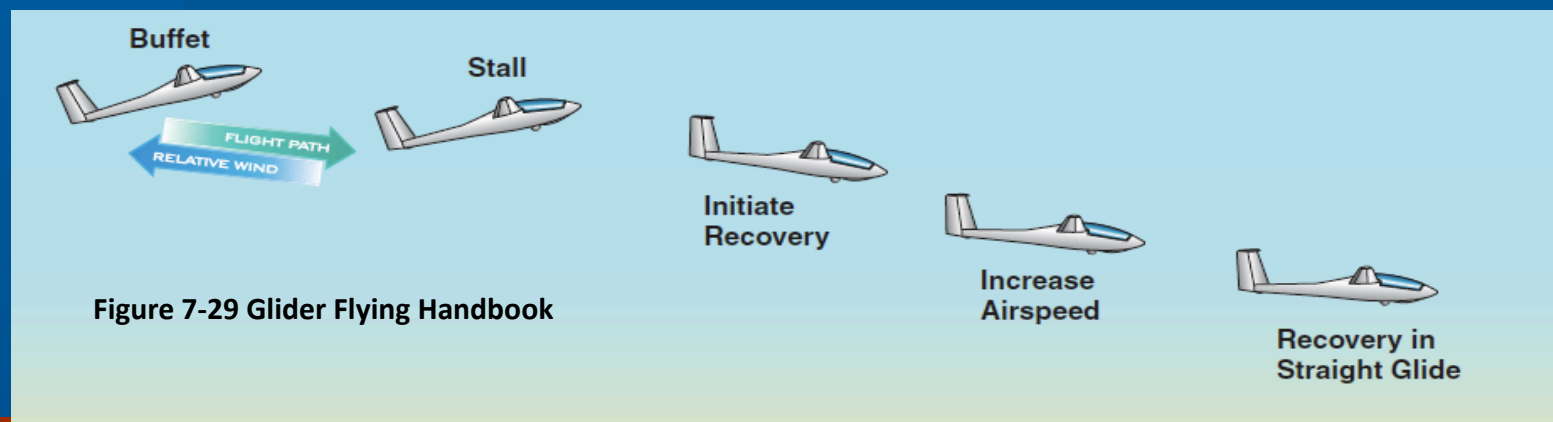
Visual Scanning Factors

- What are the atmospheric conditions?
- What physical obstacles (canopy rails, instruments, passengers, ...) must you work around?
- Where is traffic likely to come from?
- What electronic aids are you using?
- What are you expecting from the other pilots?

Stall Recognition

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- A stall occurs when the critical angle of attack is exceeded
- Stall speed is a function of the gliders weight
- In turning flight the stall speed increases





Stall/Spin Fatal Accidents

- **26 Oct, 2007 - The pilot's failure to maintain aircraft control while maneuvering resulting in an inadvertent stall and impact with terrain.**
- **10 Aug, 2007 - The pilot's failure to maintain aircraft control while maneuvering and the inadvertent entry into a stall/spin. Contributing to the accident were the mountainous terrain conditions, unfavorable wind conditions, and the terrain-induced turbulent wind conditions.**
- **29 Apr, 2007 - the pilot's failure to maintain aircraft control resulting in an inadvertent stall/mush.**
- **25 Aug, 2006 - The pilot's failure to maintain aircraft control. Factors were the low airspeed and the inadvertent stall and spin.**



Stall Recognition Scenario

- You and your instructor are going to practice inadvertent stalls from a thermaling turn. After clearing the area, enter a thermaling turn. Your instructor will then begin creating realistic distractions
 - Look to the outside of the turn for other traffic then quickly tighten the turn
 - The objectives are (1) prompt and correct recovery from a stall and (2) recognize the impact of distractions on performance



Stall Recognition Factors

- What are the stall characteristics of your glider?
- What warning signs are you looking for?
- How obvious are the warning signs in turning stalls?
- What are the correct recovery procedures?

Simple Glide Recognition

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- **Determining altitude needed to glide a certain distance is a primary task for glider pilots**
- **Manual and electronic glide calculators can provide this information.**
- **You can also verify this information by looking out the window while flying at a constant speed**
 - **Ground reference moving up – you are falling short**
 - **Ground reference not moving – on glideslope**
 - **Ground reference moving down – gaining on glideslope**

Glide range Scenario

- At a safe altitude, a mile from the gliderport, pick an object 3-5 miles beyond the field and start a straight glide toward that point. Watch the motion and determine if you could glide to that point, go past it, or fall short.

Glide range Factors

- What should the glide ratio (L:D) be?
- How much altitude should you need to cover 1 mile?
- Is the glider performing to your expectations?
- Are you dealing with a head wind, tail wind or no wind?
- What if the winds were different?

Goal Orientated Approach

9

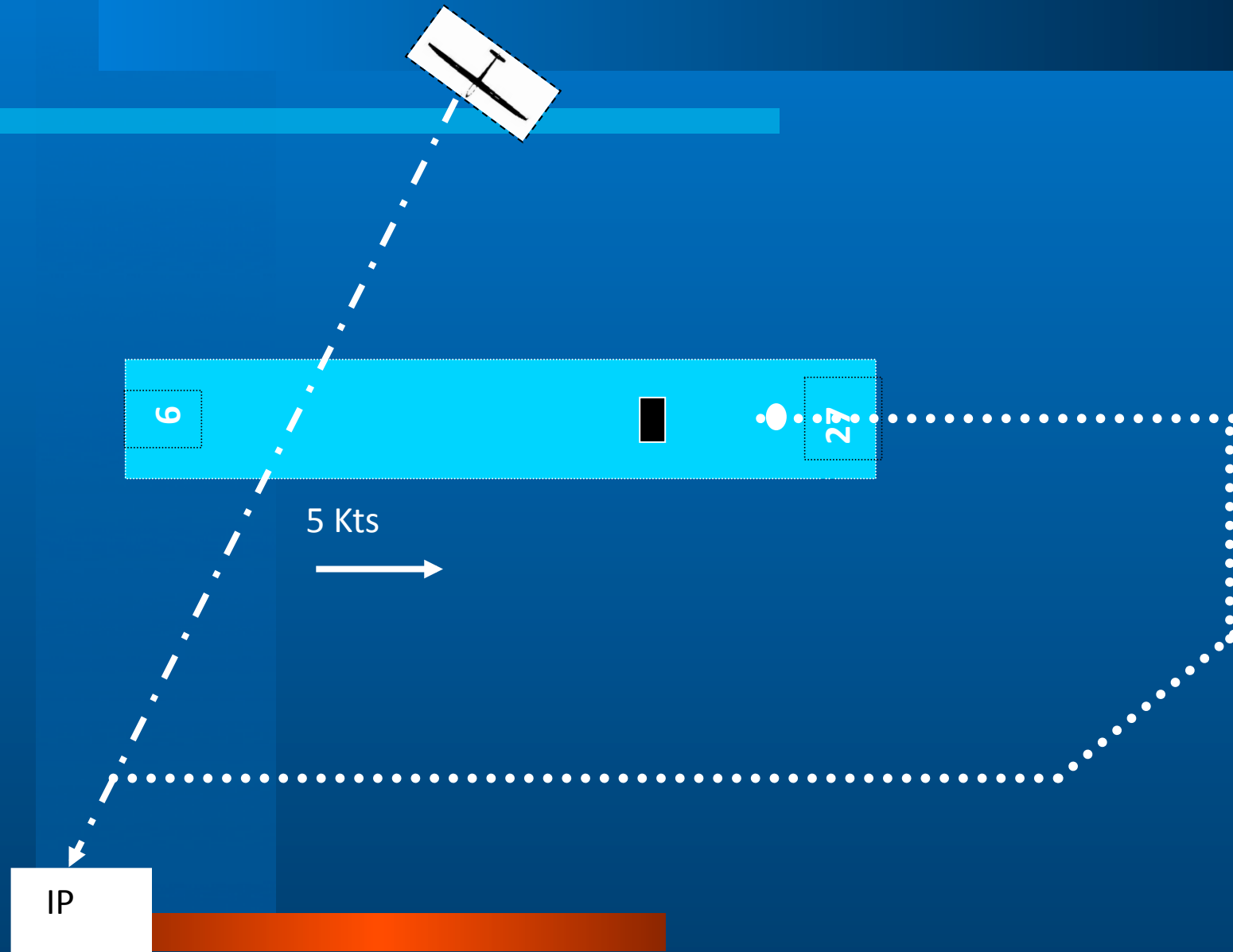
- **What your instructor wanted to teach you**
 - Make sure you control your speed to keep from stalling
 - Make sure you control your height and position so you reach the intended landing point
- **What most glider pilots seem to hear**
 - You must start the approach from the normal Initial Point (IP)



Approach & Landing

- Major drawback is that primary focus is on reaching the IP.
- This technique works well when students plan ahead to reach the IP at the desired altitude.
- What happens when this planning breaks down and the student is 1 mile out at 1200 ft and runs into 500 fpm sink?
- Experience shows glider pilots still fly towards the IP

Goal is IP point

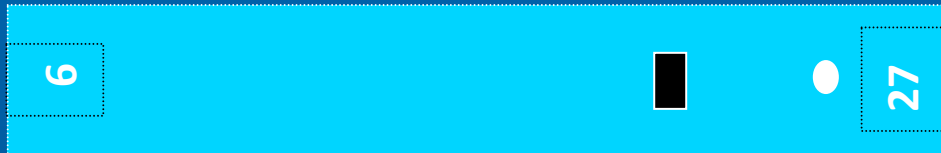




Choose Your Approach



Goal is Touchdown Point?

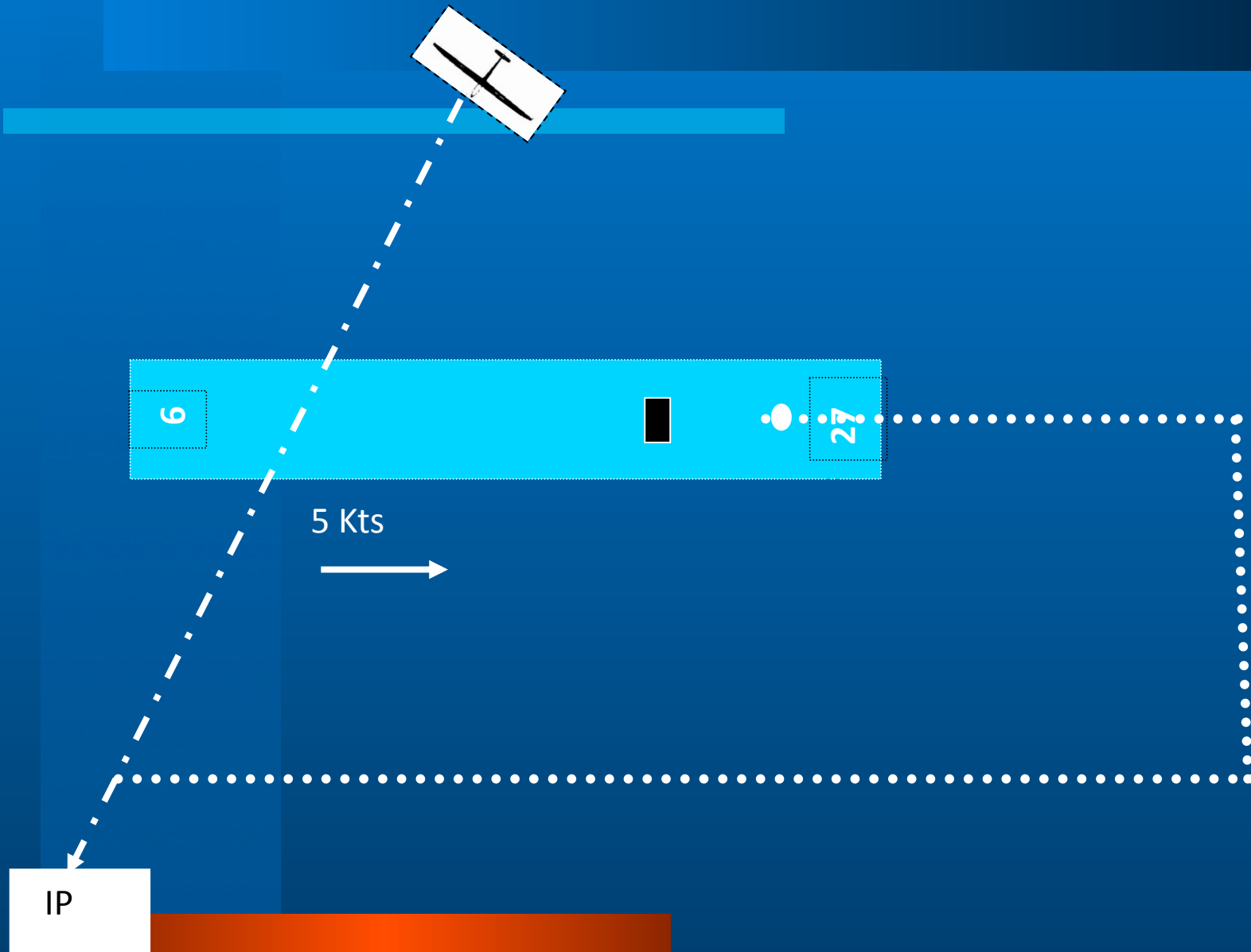


5 Kts

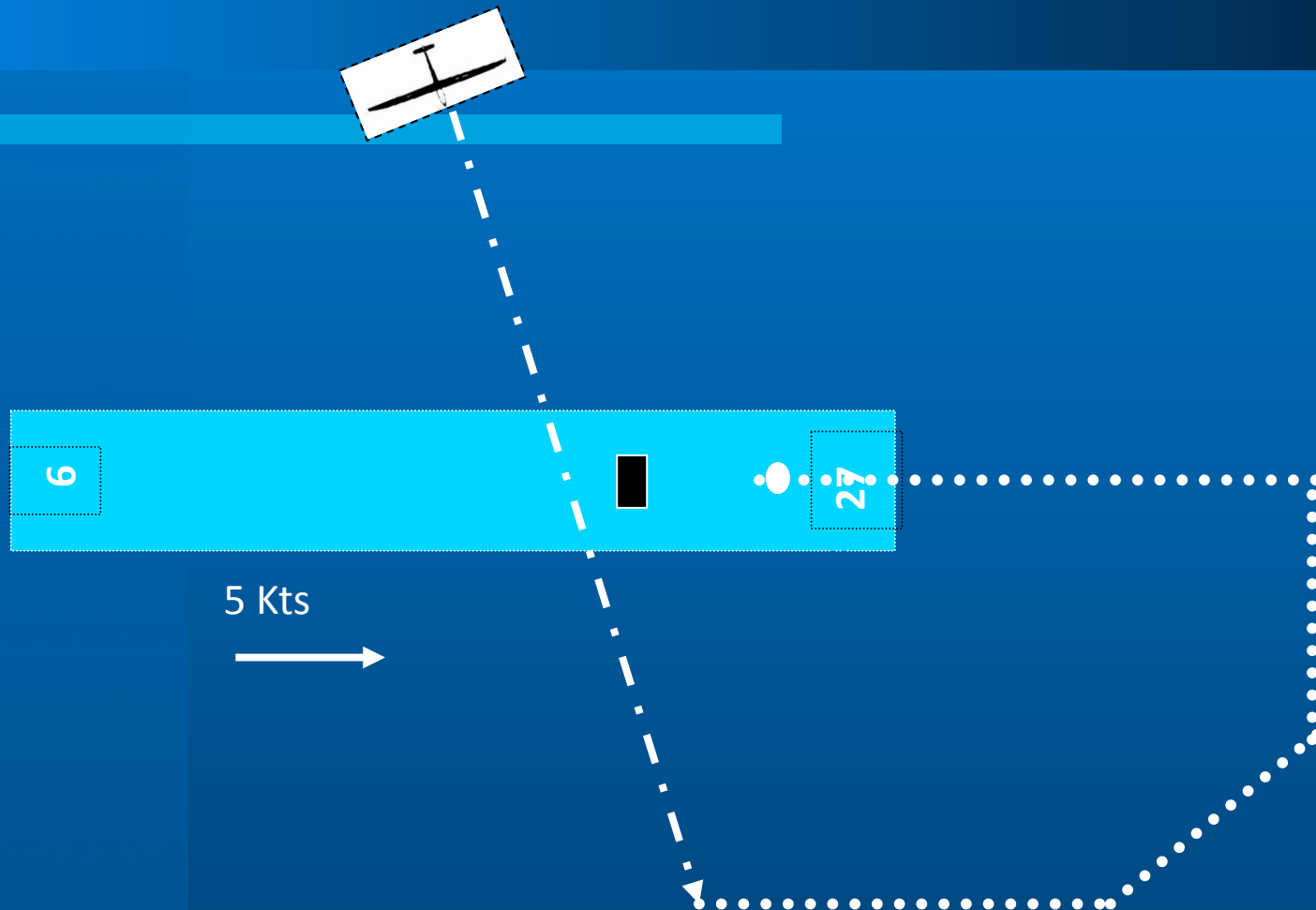


IP

Goal is Touchdown Point

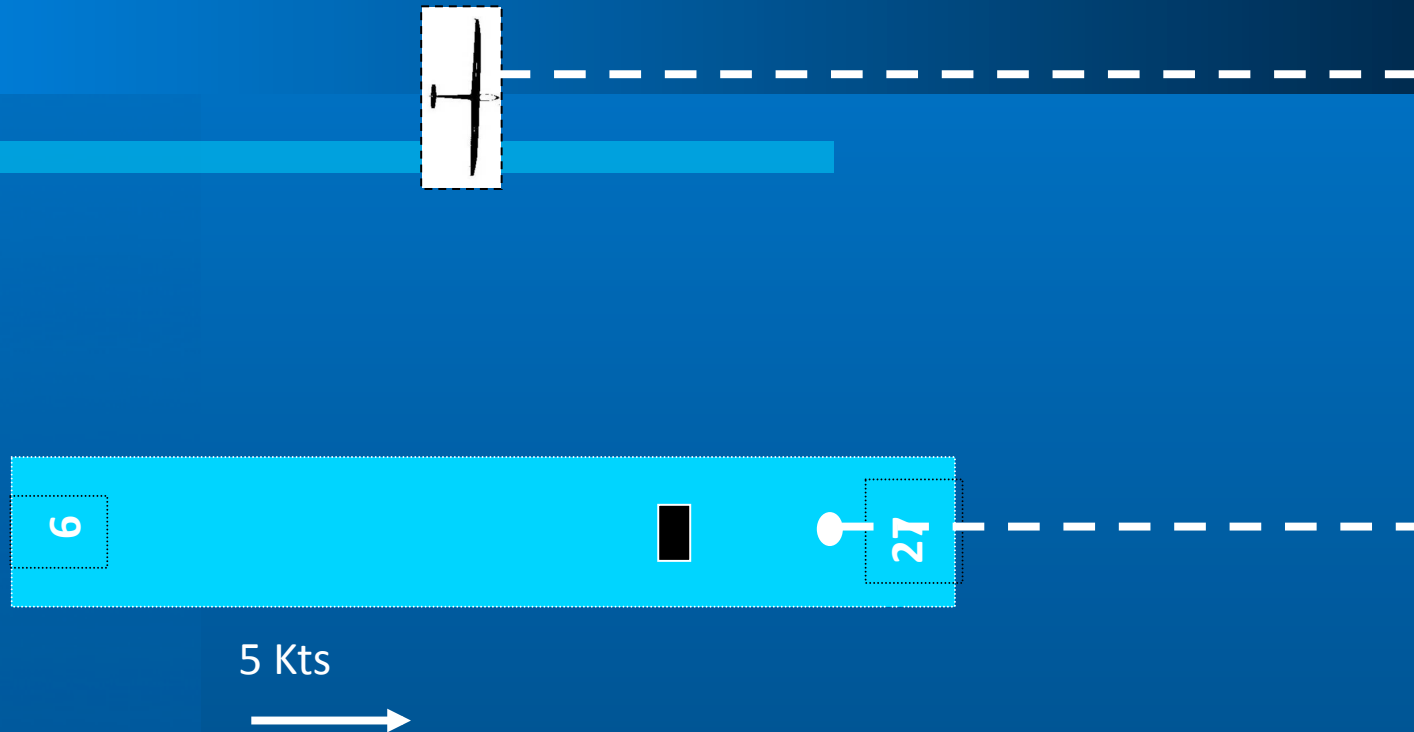


Optional Approach 2

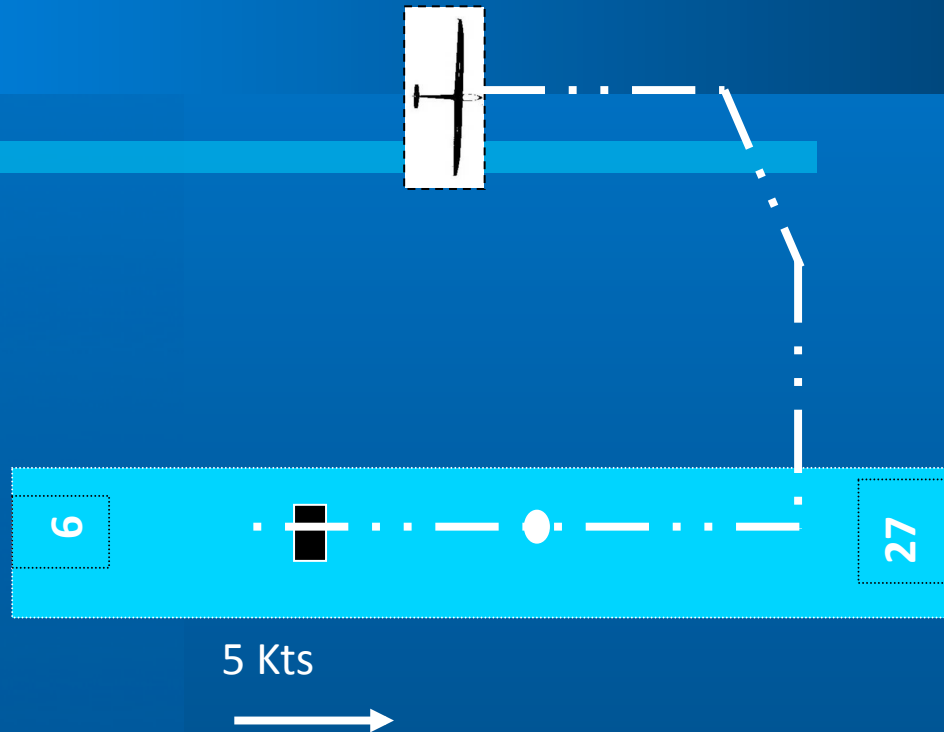


IP

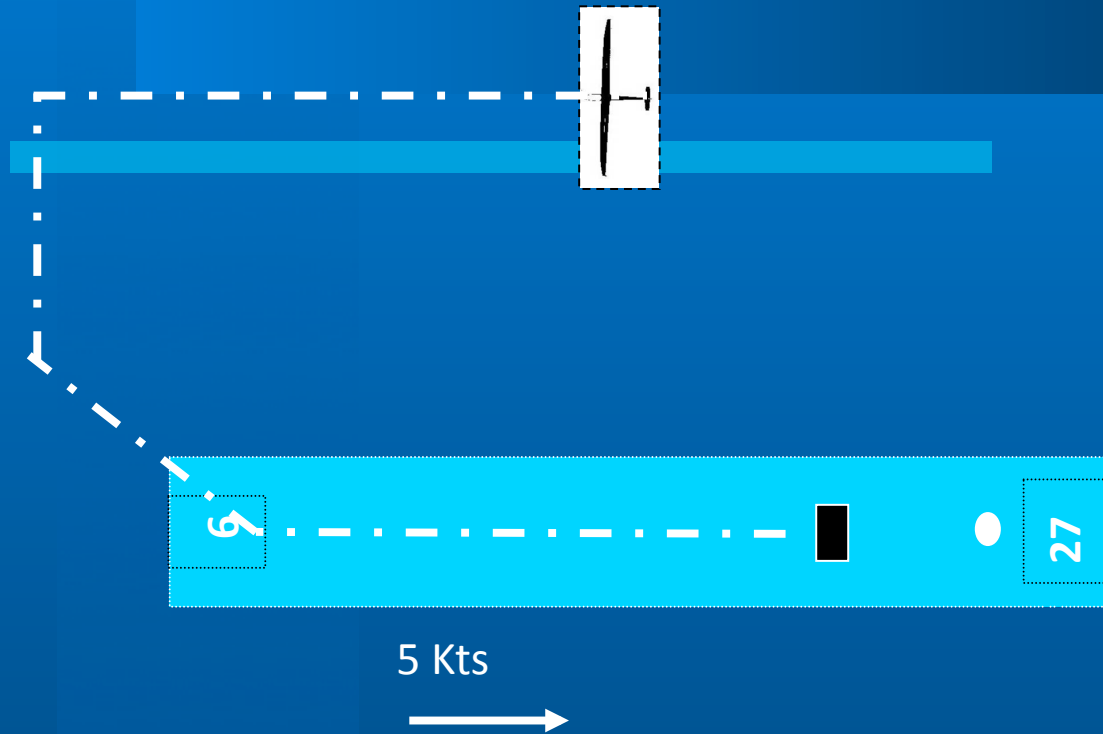
Optional Approach 3



Optional Approach 4

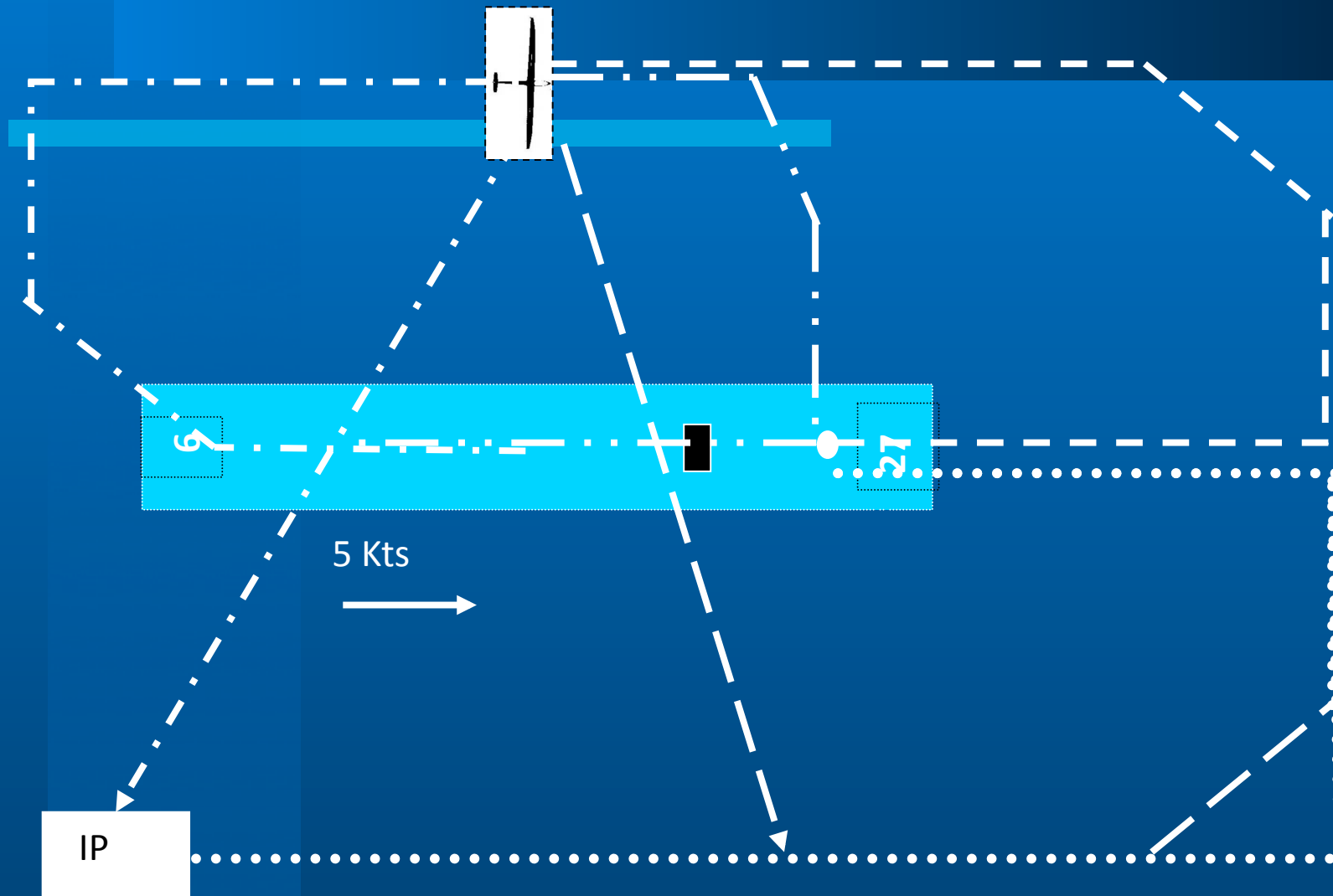


Optional Approach 5



IP

Which Approach?





Landing Scenario

- You are flying a club glider and your hour is about up. Coming back to the field you encounter some heavy sink. How will you modify your pattern to make a safe landing?



Landing Factors

- What other traffic is in the area (radio calls)?
- What is your altitude and how fast is it changing?
- What are the 3 best options right now?
- What will the other club members say if you fly an abbreviated pattern?

Post flight Critique

10

- Review the decisions you made during the flight
- Use data loggers and software to view the flight
- Find 3 points where you made good decisions
- Identify weak areas and contact an instructor to develop a customized training program



Critique Scenario

- Your flight review (FAR 61.56) is due next month. In preparation, your instructor asks you for a list of 3 things you want to know more about. What will you tell him/her?

Critique Factors

- Your experience level, currency and proficiency
- What books do you have to review?
- Do you have any flight traces?
- What is your environment like (airspace, traffic, other airport users)?



10 Things you Forgot

1. Don't Crash
2. ADM
3. SPRM
4. Pre-launch checklist
5. PT3 plans *for this launch*
6. Visual scanning
7. Stall recognition
8. Simple glide verification
9. Landing objective
10. Post flight critique

Conclusions

- Forgetting where you put your car keys can be an annoyance
- Forgetting your basic airmanship skills can be deadly
- What skills have you forgotten!
- What are you going to do about it?

Outline

- Who is the SSF
- Basic instruction
- The 'Law of Primacy'
- What you Forgot!
- Conclusions

10 Things you Forgot

1. ADM – multiple pilots call in 2 min out
2. CRM – CRM for the rest of us
3. Pre-launch checklist – written checklist usage
4. PT3 plans for this launch – intentional vs unintentional release
5. Visual scanning – detection and using ppt
6. Stall recognition – emphasis recognition task
7. Simple glide verification – watching the spot
8. Hazards of low altitude maneuvering – accident reports from 2007
9. Landing objective – reach the IP or landing spot
10. Post flight critique – self critique and flight analysis tools



Basic Instruction

- **A basic instruction program contains:**
 - **A student/instructor syllabus**
 - **Ground instruction**
 - **Introduce new material**
 - **Basic decision making skills**
 - **Evaluation and critique performance**
 - **Flight instruction**
 - **Basic decision making skills**
 - **Basic motor skills**



Sample Syllabus Lesson Plan

Lesson #1 Reading Assignment: Glider Flying Handbook 1-2 thru 1-10, 2-1 thru 2-5, 4-1 thru 4-7, 4-11 thru 4-15, 6-4 thru 6-5, 7-22 thru 7-25

Ground Instruction: 30 min.
Instruction: 15 min.

Flight

Preflight: 15 min.

1 Flight

Explain Control Functions
Explain Instruments
Pre-launch checklist
Explain Scanning Technique

Orientation Flight
Demonstrate

Practice Visual Scanning

Demonstrate Effect of Controls

Post Flight: 15 min.

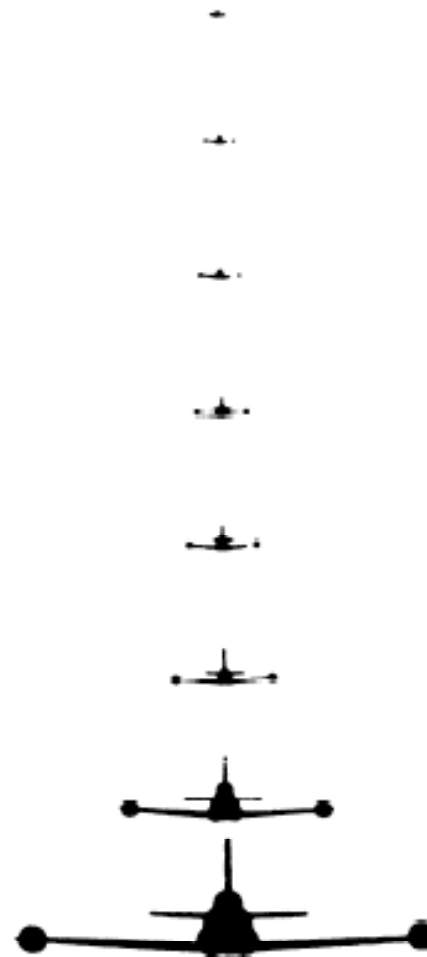
Answer Questions
Sign Logbook

The 'Law of Primacy'

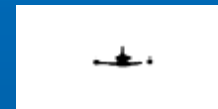
- Things learned 1st create a strong impression in the mind that is difficult to erase.
 - Working for you: You spot a thermaling glider when you need a climb
 - Working against you: During a simulated PT3 event you turn right, downwind

DISTANCE - SPEED - TIME

M P H	600	360
	SECONDS	
10 miles	60	100
6 miles	36	60
5 miles	30	50
4 miles	24	40
3 miles	18	30
2 miles	12	20
1 mile	6	10
$\frac{1}{2}$ mile	3	5



Is a collision imminent?

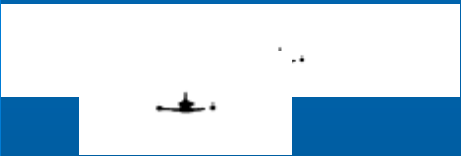




















Which picture is different?

