

How To Avoid Canopy Collisions

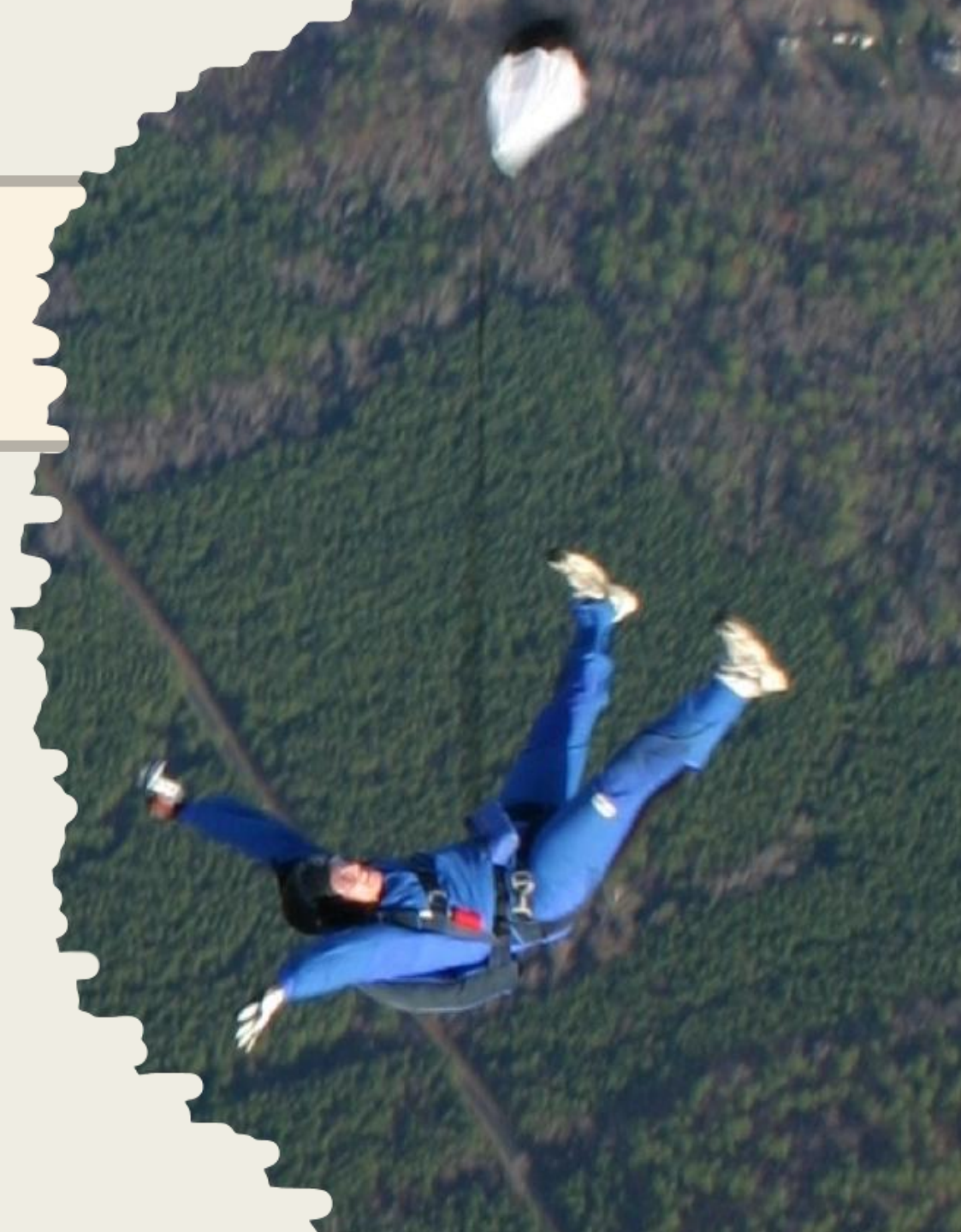


A USPA Safety Day Presentation



Easiest way?

Jump alone
(OK, NOT Practical)



Because skydivers like to jump in groups

the two greatest risks of a canopy collision are:



During Deployment
and
In the Landing Pattern



Deployment Separation

Planning starts
on the ground
BEFORE the jump

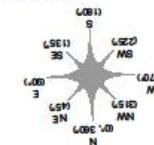
E CANOPY OBJECTIVES

Performance goals:

Airport orientation: The runway at West Point Skydiving Adventures is 3,700 feet long, about 3/5 (.6) mile. Aircraft enter their traffic pattern at 1,000 feet. Add "0" to the runway number for compass heading. (Runway 9 is 90 degrees, 27 is 270 degrees.) Compare the number on the runway to this compass rose (below right) to determine direction.

Landing pattern: Show the direction of the surface winds on the DZ photograph. Draw the planned wind line, spot, and landing pattern, including ground checkpoints and altitudes. Identify all significant landing hazards.

Ground checkpoints	Altitude
1.	Opening Altitude
2.	1,000
3.	600
4.	300
Landing hazards:	



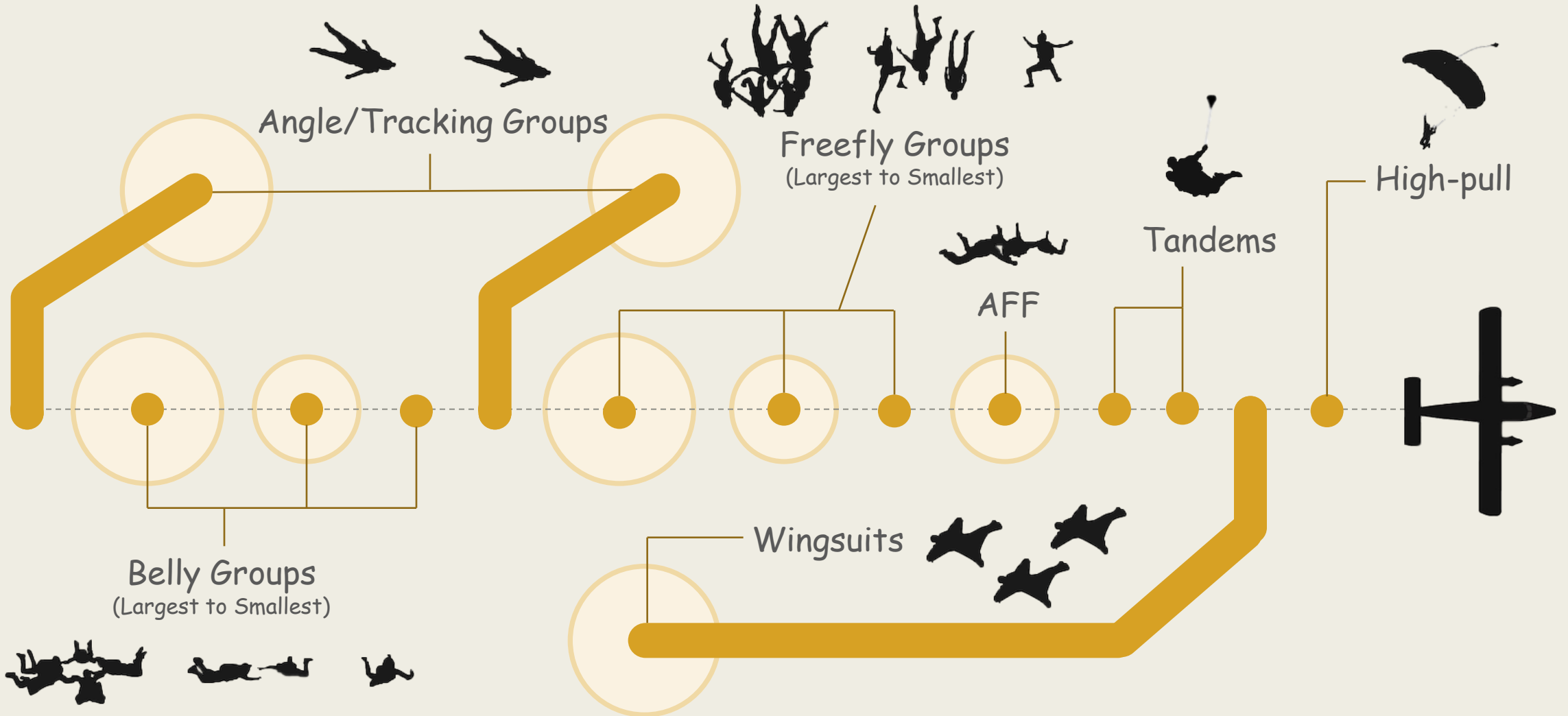
Two Considerations Regarding Collisions Up High

1. Separation between groups
2. Separation between jumpers
IN each group

Group Separation

1. Type of jump
2. Size of group
3. Ground speed of aircraft

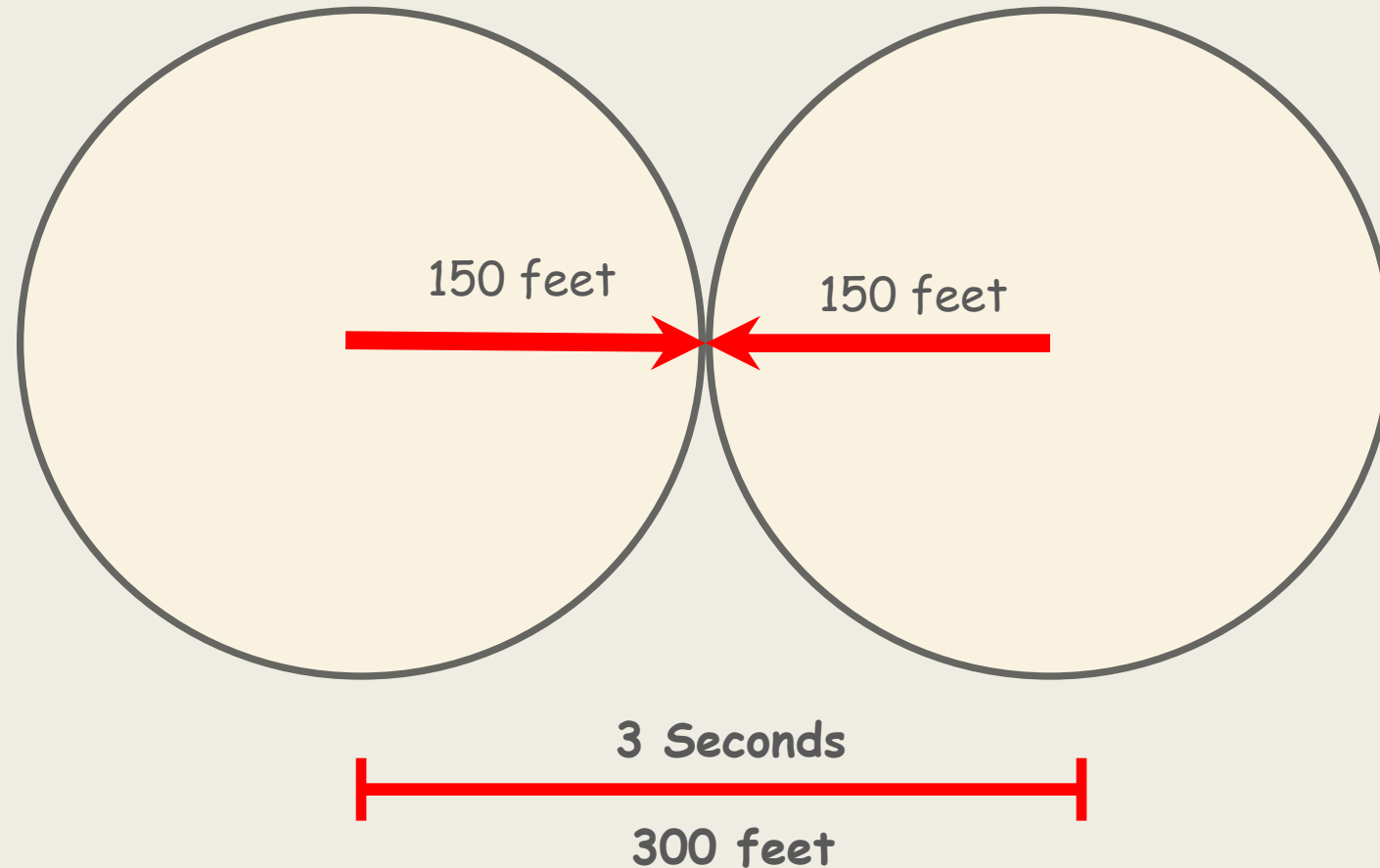
Group Separation Exit Order



Minimum Distance?

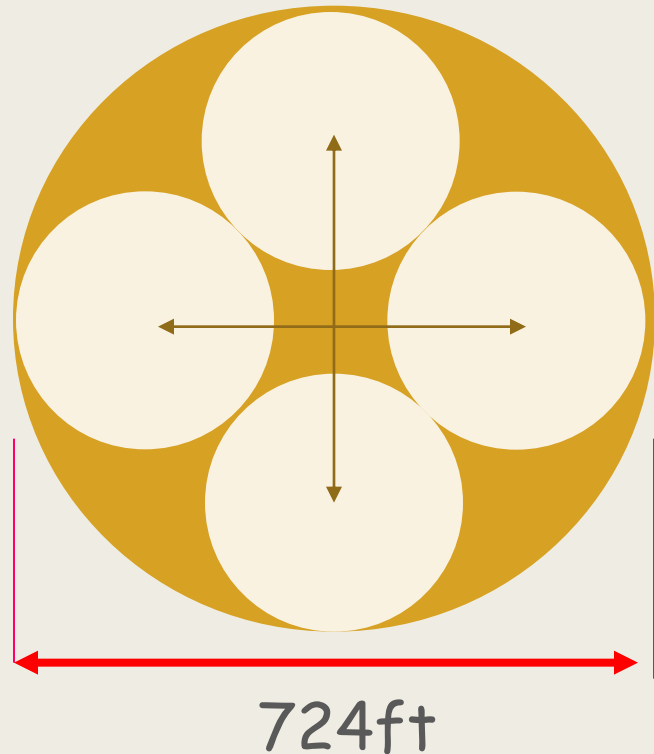
1. Canopy speed = 30 mph
(44 feet per second)
2. Three seconds required to see and respond to an approaching canopy
3. Two canopies on a head-on collision will cover 300 feet in three seconds

Minimum Separation for Two Jumpers



Thanks to Professor John Kallend for use of his separation formulas!

To obtain 300 feet of separation between jumpers in a 4-way, they each need to track 212 ft from the center, so the individuals' columns of air don't overlap.



3 seconds after opening there could be canopies anywhere in an area 724 feet in diameter.

Each group needs its own column of air.

The corresponding area for an 8-way is more than 1,000 ft. across.

Breakoff and Deployment Issues

- Lack of separation from other jumpers
(Poor tracking skills or a low breakoff altitude with inadequate tracking time)
- Jumpers unable to control the parachute after deployment (line twists or a spinning canopy due to one brake releasing)

Distance Between Groups

900 feet bare minimum

4-way
group

8-way
group

This does not account for high breakoffs or long tracks.
With sliding groups, more distance is required

Distance Between Groups

- For jump runs flown into the wind, ground speed of the aircraft is a large factor
- The stronger the upper winds, the slower the aircraft ground speed will be
- Wait longer between groups during strong upper winds
- Crosswind Jump Runs-Winds have less influence on group separation

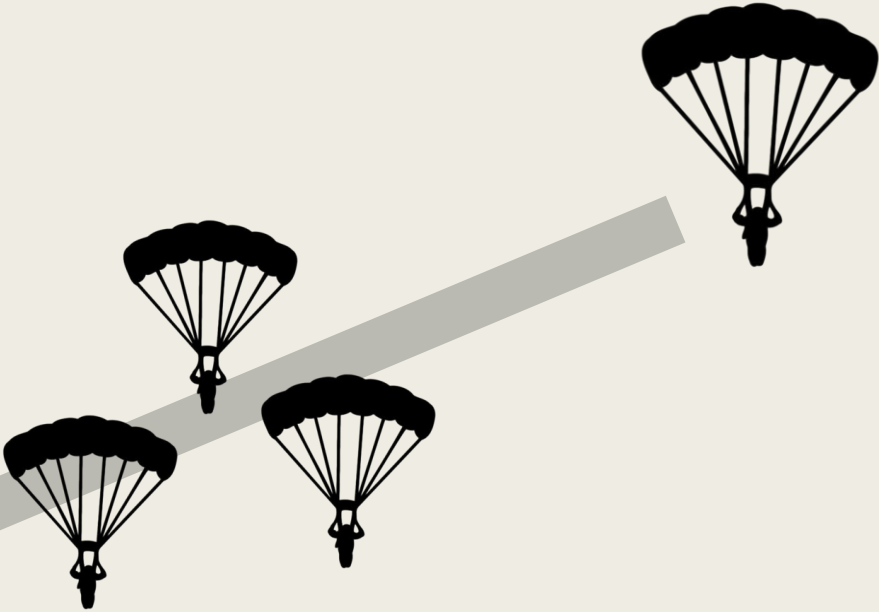
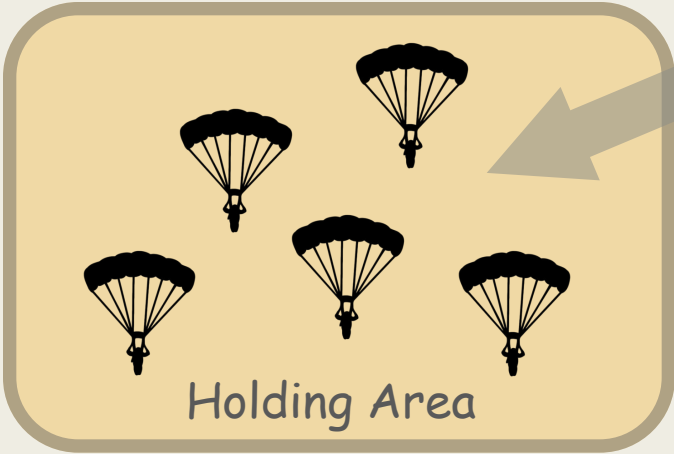
(Direction of ground winds will also play a large role in separation requirements)

Orderly Flow

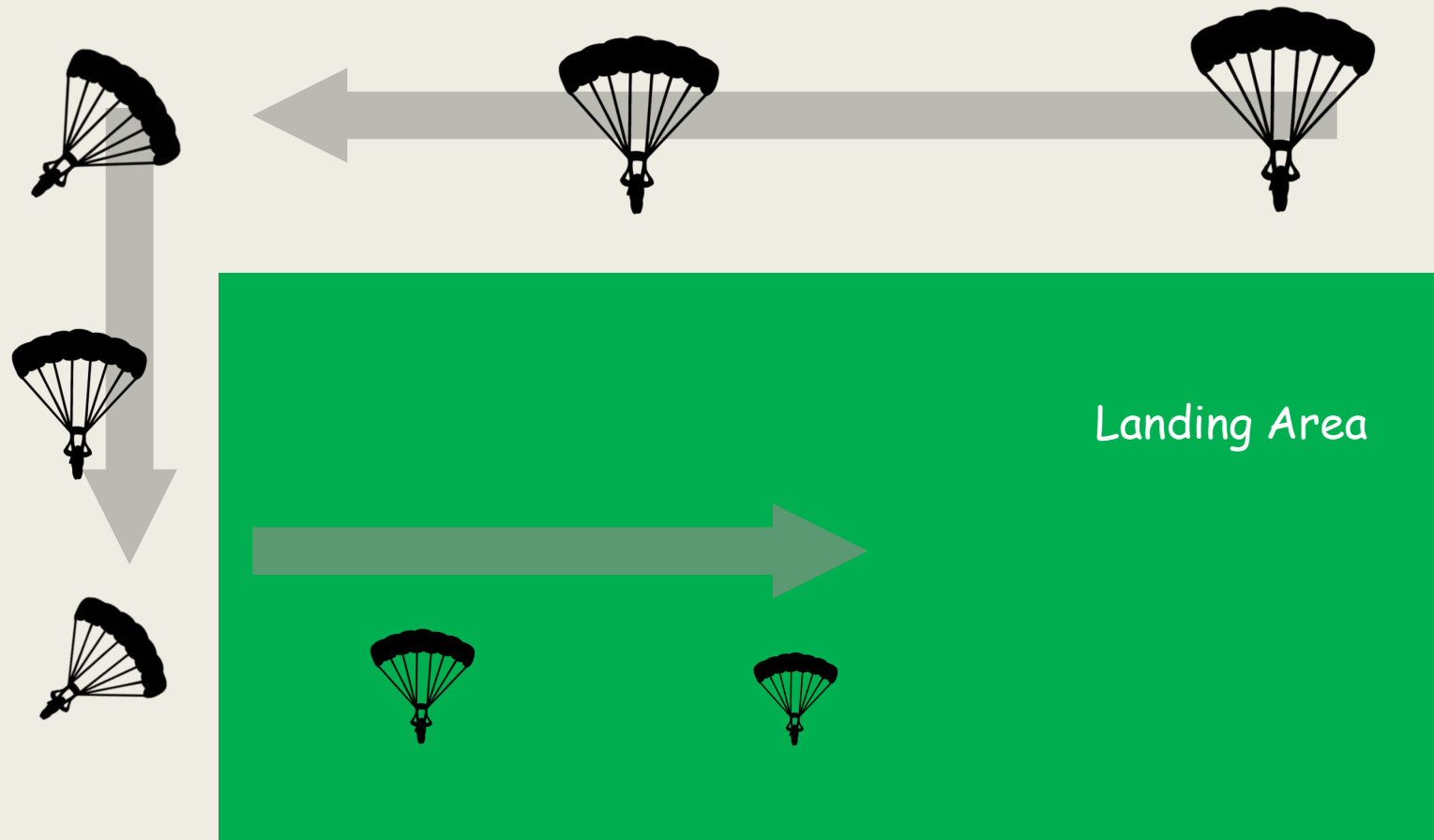
- The closest canopies pose the most immediate threat of a collision
- Identify the nearest traffic to determine what needs to happen next
- Make adjustments that will help promote an orderly flow of canopies toward the landing area

- Wing loading plays a significant factor in maintaining separation
- Try to remain in the same general area as your group
- If you catch up to another canopy during your descent, allow for plenty of room while passing
- Be aware of blind spots (above and behind)

Traffic Flow



Traffic Pattern

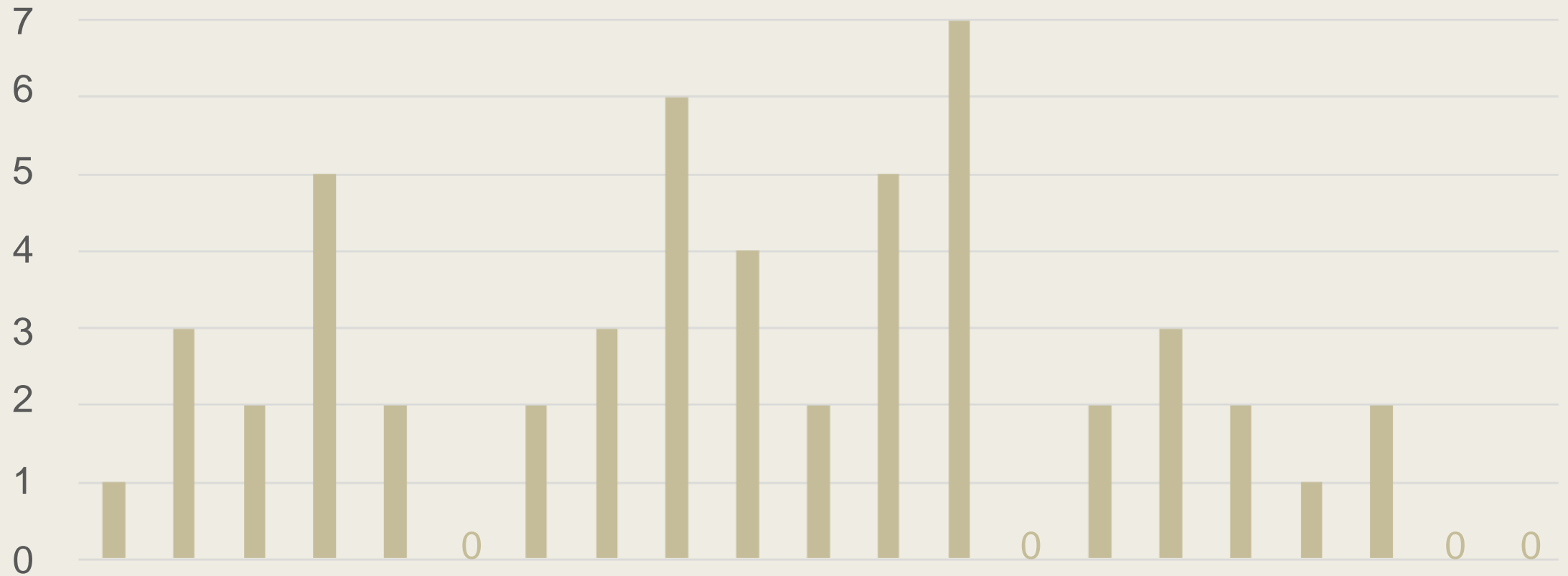


No wind? Pick a direction for landing and stick with it!

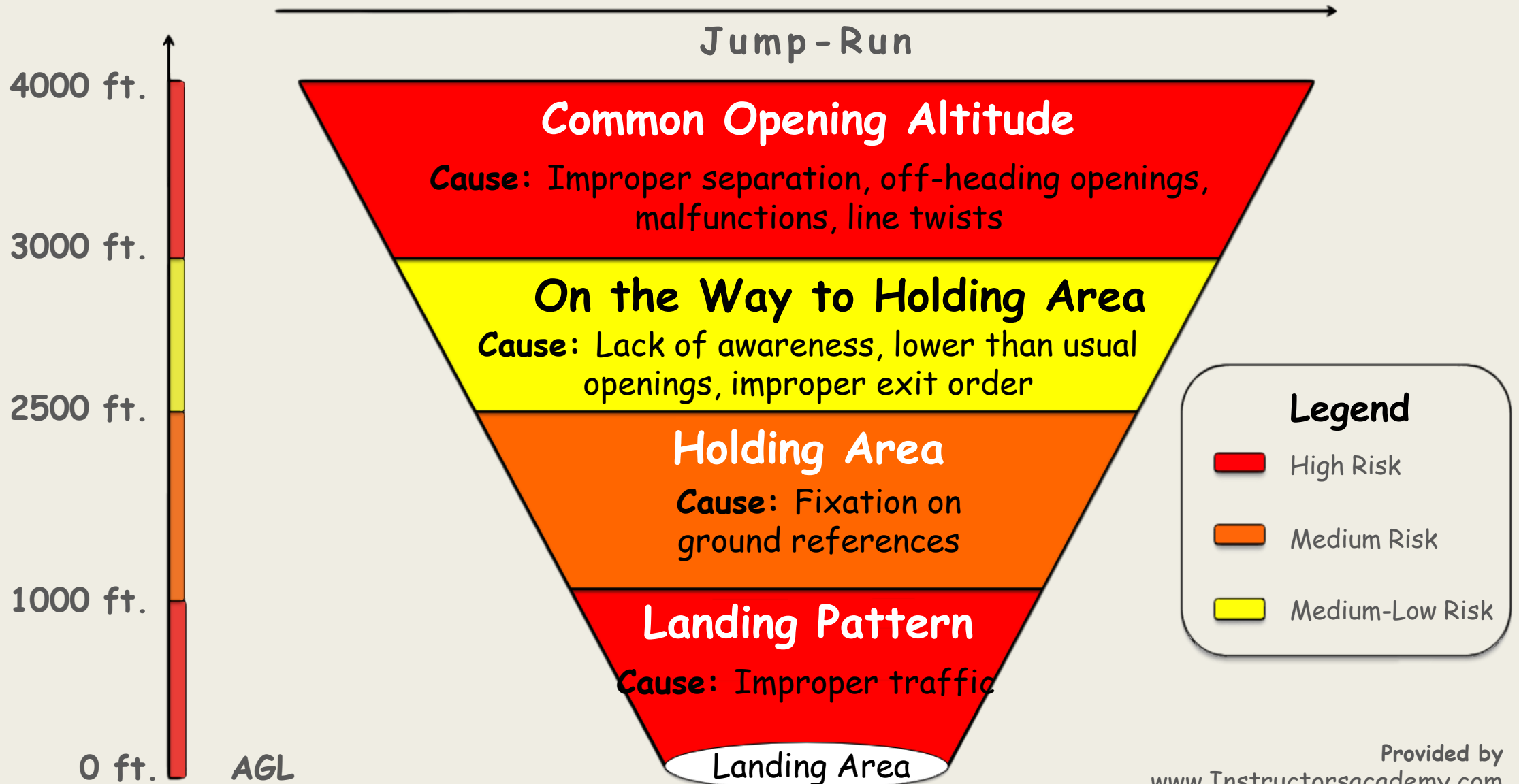
Landing Pattern Issues

- High-performance approaches separated from standard landing approaches
- Use separate landing areas or separate by time (separate pass for high-performance landings)
- Fly a predictable landing pattern (with defined downwind, base and final legs)
- Straight-in final approach without S-turns

Canopy Collision Fatalities 1999-2019



Canopy Collision Cone



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