Managing Airspeed

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Definitions

Indicated Airspeed

The airspeed shown on the airspeed indicator or the airspeed portion of the electronic flight instruments. On newer aircraft it is shown in kts (knots). In older aircraft it is in MPH (miles per hour).

Ground Speed

The speed at which the aircraft is moving over the ground. Programs like FlightAware and ADSB Exchange show the speed of the aircraft as ground speed because they do not correct for the wind.

True Airspeed

The actual speed of the aircraft through the air. True airspeed is roughly 2% higher than indicated airspeed for each 1,000 feet above sea level.

Calibrated Airspeed

The airspeed shown on the airspeed indicator is subject to errors because the air hitting the pitot tube is affected by the location of the pitot tube in the airstream.

Managing Airspeed
FARs

§ 91.117 Aircraft speed.

(a) Unless otherwise authorized by the Administrator, no person may operate an aircraft below 10,000 feet MSL at an indicated airspeed of more than 250 knots (288 m.p.h.).

(b) Unless otherwise authorized or required by ATC, no person may operate an aircraft at or below 2,500 feet above the surface within 4 nautical miles of the primary airport of a Class C or Class D airspace area at an indicated airspeed of more than 200 knots (230 mph.). This paragraph (b) does not apply to any operations within a Class B airspace area. Such operations shall comply with paragraph (a) of this section.

(c) No person may operate an aircraft in the airspace underlying a Class B airspace area designated for an airport or in a VFR corridor designated through such a Class B airspace area, at an indicated airspeed of more than 200 knots (230 mph).

(d) If the minimum safe airspeed for any particular operation is greater than the maximum speed prescribed in this section, the aircraft may be operated at that minimum speed.

Managing Airspeed

V Speeds

Takeoff

- Vr - Rotation speed
- Vy - Best rate of climb speed. Greatest gain in altitude in a given **time**.
- Vx - Best angle of climb speed. Greatest gain in altitude in a given **distance**.

Cruise

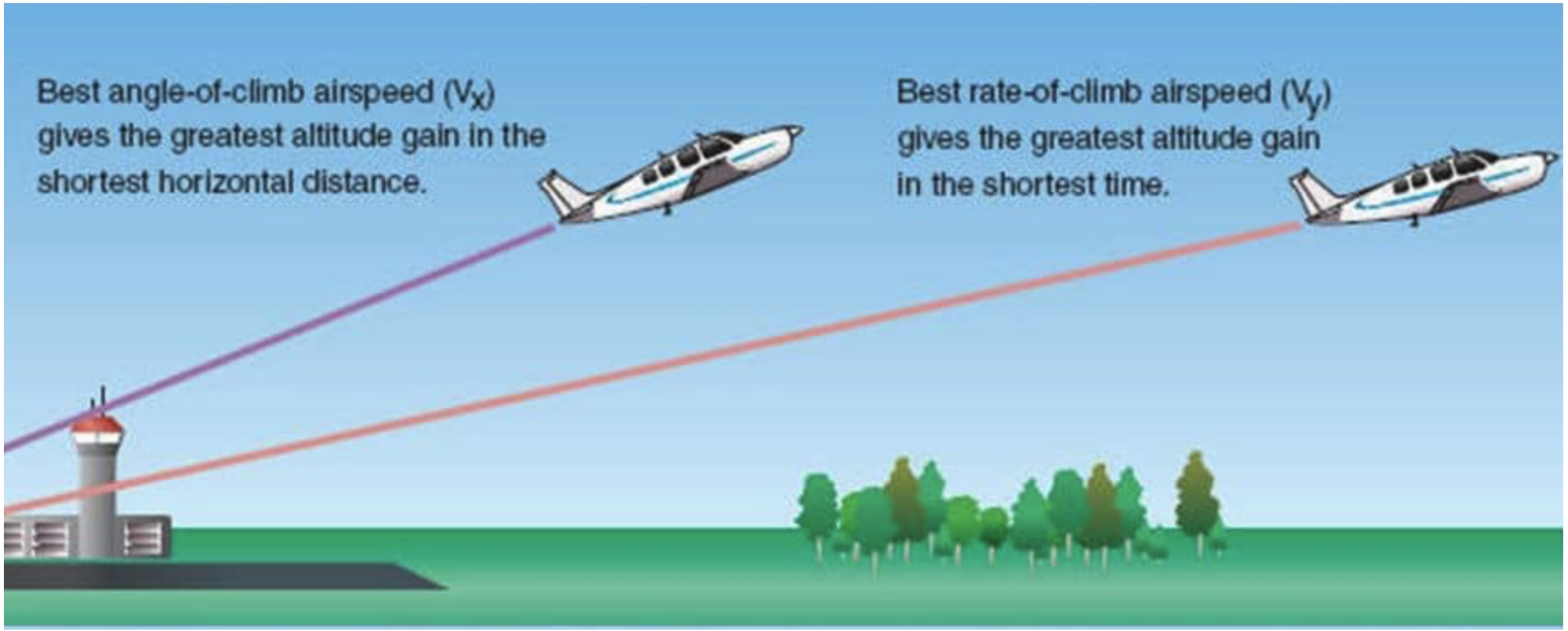
- V_A - Maneuvering Speed. The maximum speed when in rough air.
- V_{NO} - Maximum Normal Operating Speed. The green arc on the indicator.
- V_{NE} - Never Exceed Speed. Structural damage may occur.

Landing

- Vso - Stall speed with gear and flaps extended
- 1.3 * Vso - The speed at which you cross the threshold.
- V_{FE} - Flaps extended speed. The white arc on the airspeed indicator.

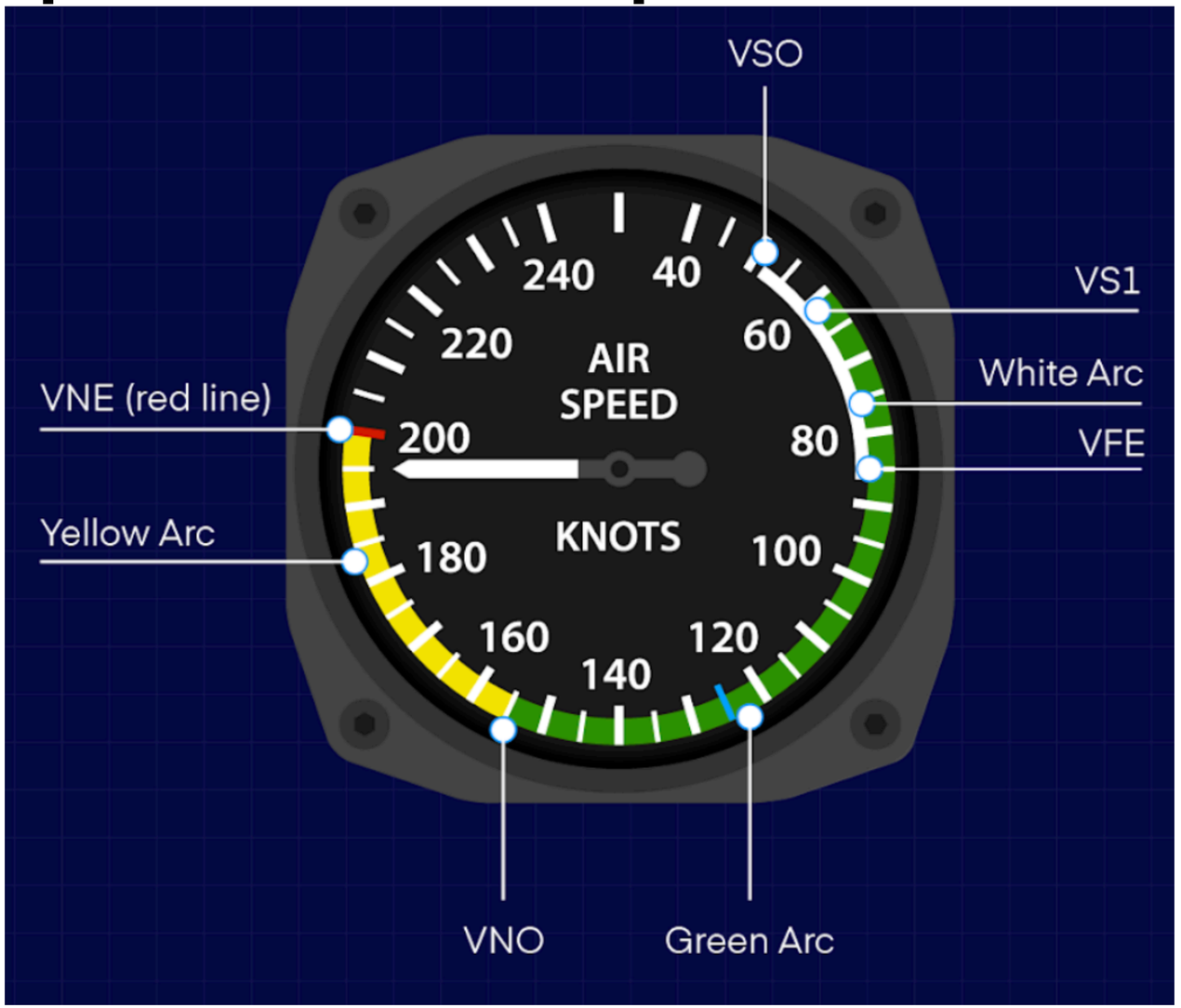
Managing Airspeed

Vx vs Vy



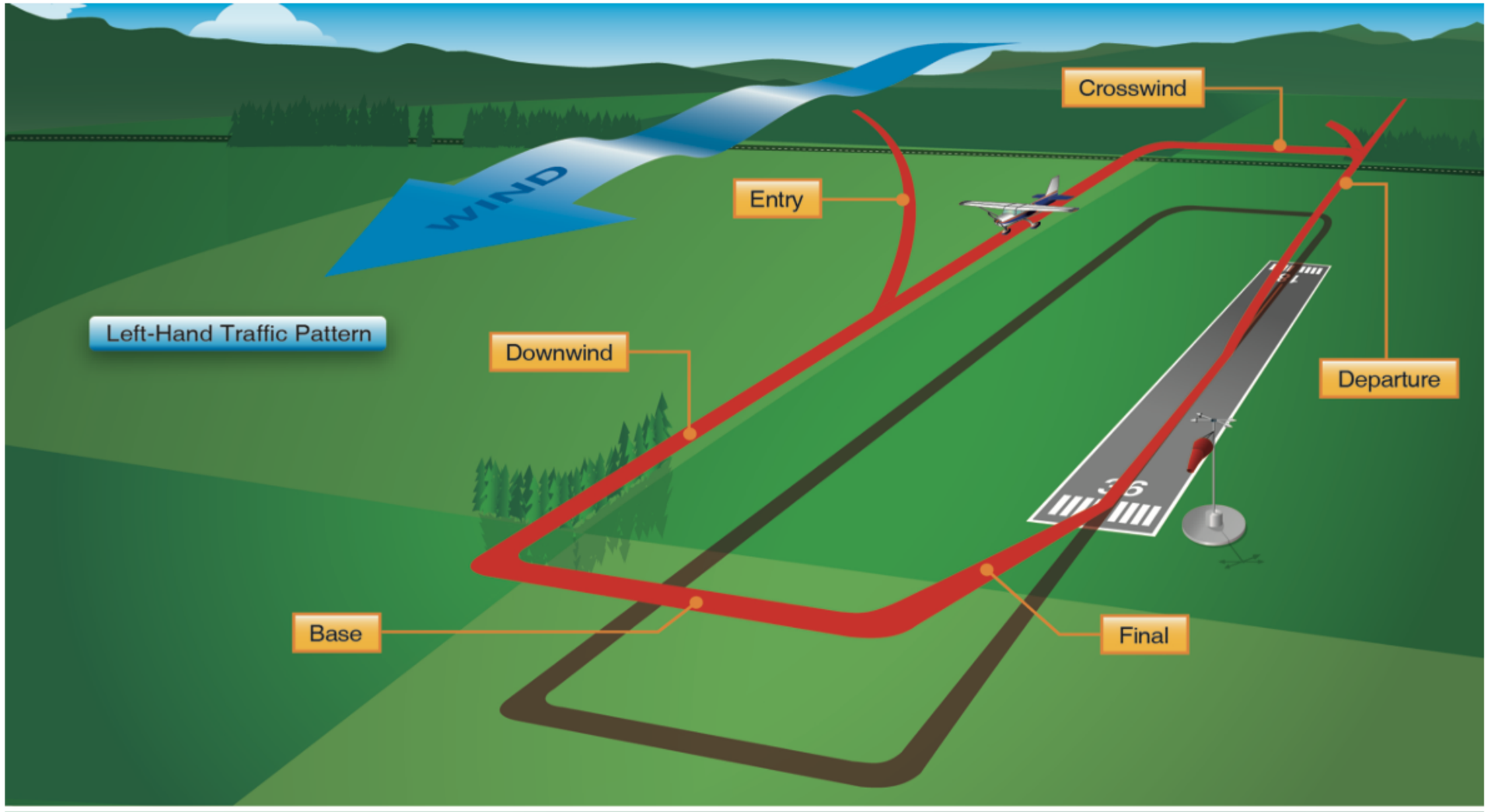
Managing Airspeed

Speeds on the Airspeed Indicator



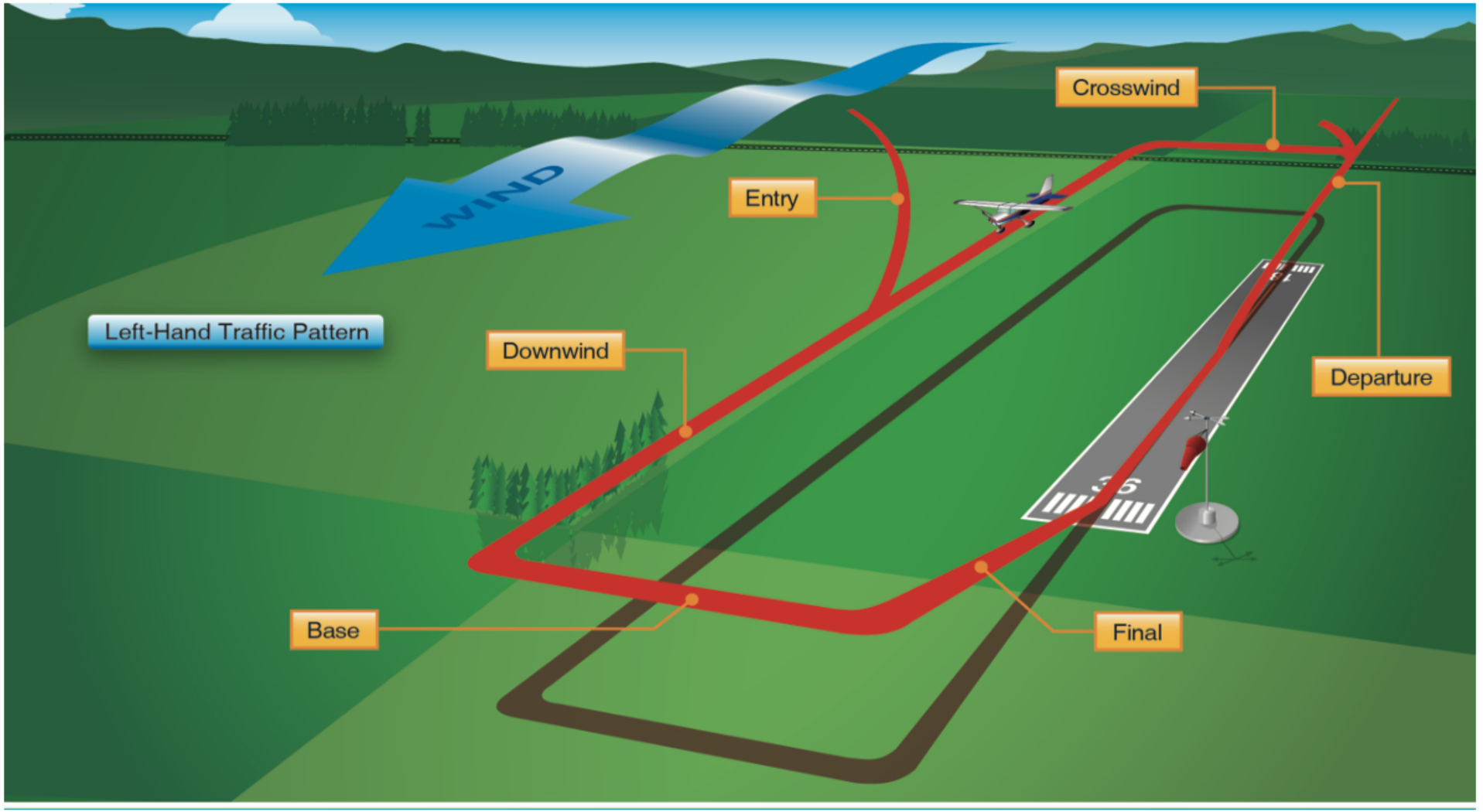
Managing Airspeed

Traffic Pattern



Managing Airspeed

Traffic Pattern Speeds



Pattern Altitude

Usually 1,000´ AGL

Often 800´ AGL

Pattern Speeds

Downwind—100

Base—90

Final—80

Threshold—1.3 * Vso

Touchdown—Vso

Managing Airspeed

Cherokee 140 - Stall Speeds

STALL SPEED TABLE		
Angle of Bank	Flaps 40°	Flaps Retracted
0°	55 MPH	64 MPH
20°	57 MPH	66 MPH
40°	63 MPH	73 MPH
60°	78 MPH	91 MPH
Power Off – Gross Weight 2150 lbs.		

Managing Airspeed

Stall Speeds - Cessna 172

MOST REARWARD CENTER OF GRAVITY

WEIGHT LBS	FLAP DEFLECTION	ANGLE OF BANK							
		0°		30°		45°		60°	
		KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
2300	UP	42	50	45	54	50	59	59	71
	10°	38	47	40	51	45	56	54	66
	40°	36	44	38	47	43	52	51	62

Managing Airspeed

Stall and Spin Recovery

Stalls Recovery

- Nose down
- Add power.

Recover: Nose up, gradually raise flaps, reduce power for level flight.
Be careful that you don’t raise the nose too far to enter another stall.

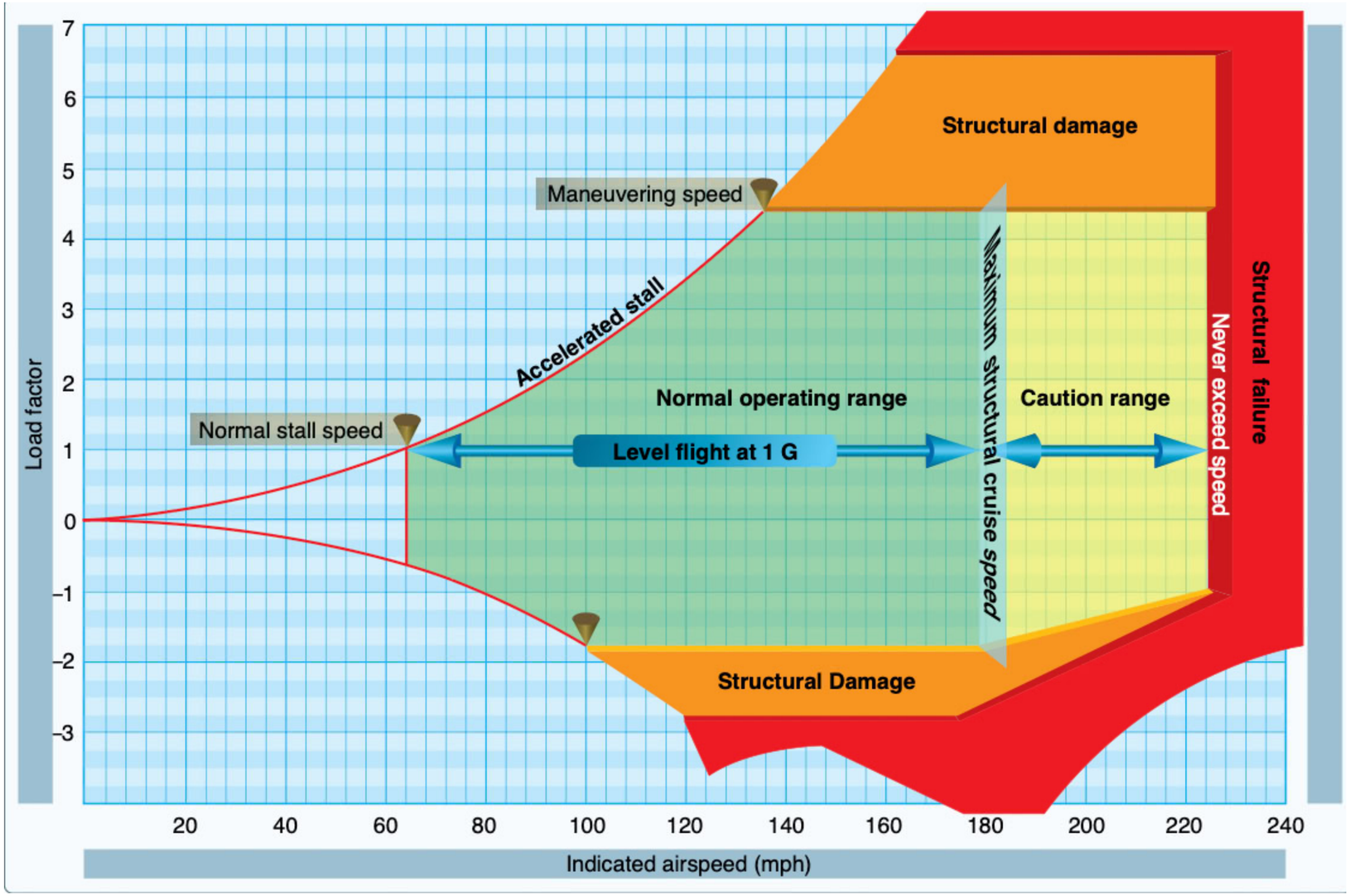
Spin Recovery

- **P**ower to idle.
- **A**ilerons to neutral.
- **R**udder opposite the direction of spin.
- **E**levator Forward

Your plane will fly itself out of the spin. When it does, bring your rudder to neutral, and raise the nose, and slowly add power to get as you get back to level flight.

Managing Airspeed

Maneuvering Speed



Managing Airspeed

Cherokee Airspeeds

Cherokee 140 Speeds—MPH

V_X	74	V_X and V_Y are at gross weight
V_Y	85	less if light
V_A	129 Heavy	
V_A	108 Very Light	50° Bank 79 MPH
V_{NE}	171	Lift nose 50-60 MPH
V_{SO}	55	
V_{S1}	64	
V_{FE}	115	
Best Glide 83		

Managing Airspeed

Cessna 172 Airspeeds

Cessna 172 Speeds—KIAS		
V_X	62	V_X and V_Y are at gross weight
V_Y	74	
V_A	105 Heavy	Max Demonstrated Xwind 15
V_A	90 V Light	
V_{NE}	163	Engine Failure After Takeoff
V_{NO}	129	Flaps Up 70
V_{SO}	40	Flaps Down 65
V_{S1}	48	
V_{FE}	110/85	Rotate 55, Climb 70-80
Best Glide 68		Approach 65-75, Landing 61

Managing Airspeed

Cessna 210 Airspeeds

Cessna 210 Speeds—MPH

V_X	90	Lift nose 70-80 MPH
V_Y	110	
V_A	135 Heavy	
V_A	110 Very Light	
V_{NE}	225	
V_{SO}	65	
V_{S1}	75 Category A	
V_{FE}	160 20°-30° 120	
V_{GE}	160	