

Introduction to Airplane Flight Instrumentation

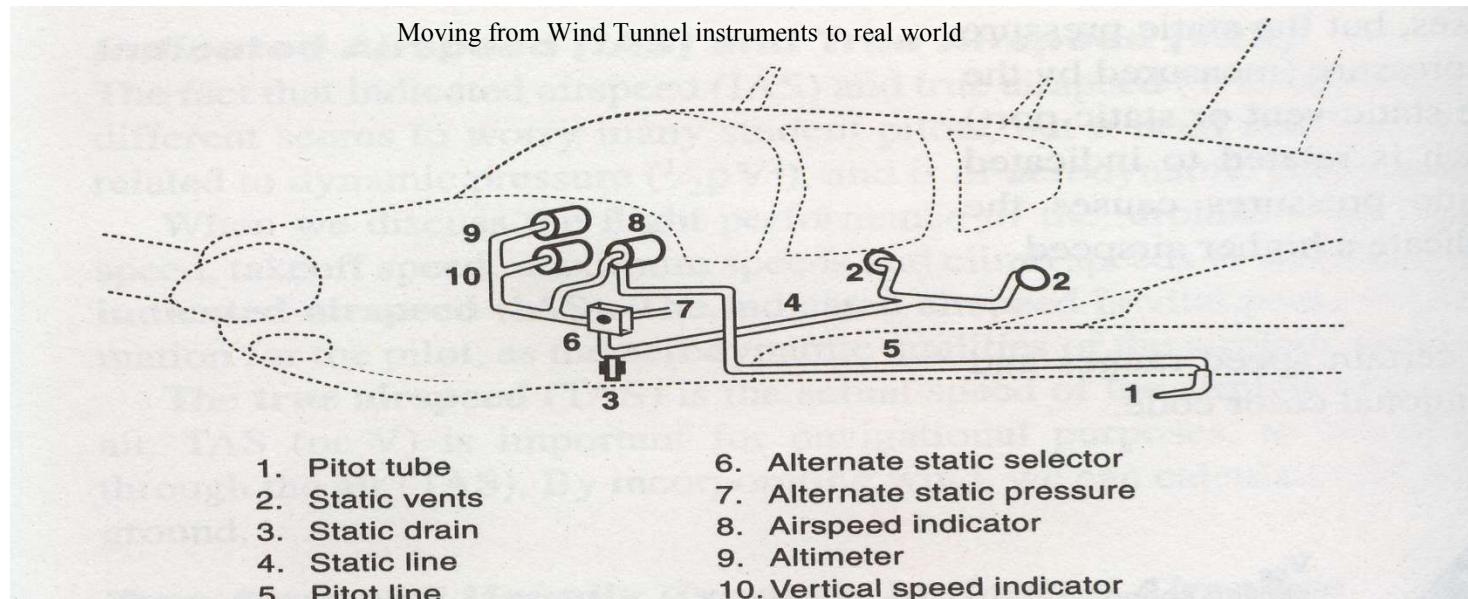


Figure 8-4. Typical pitot-static installation

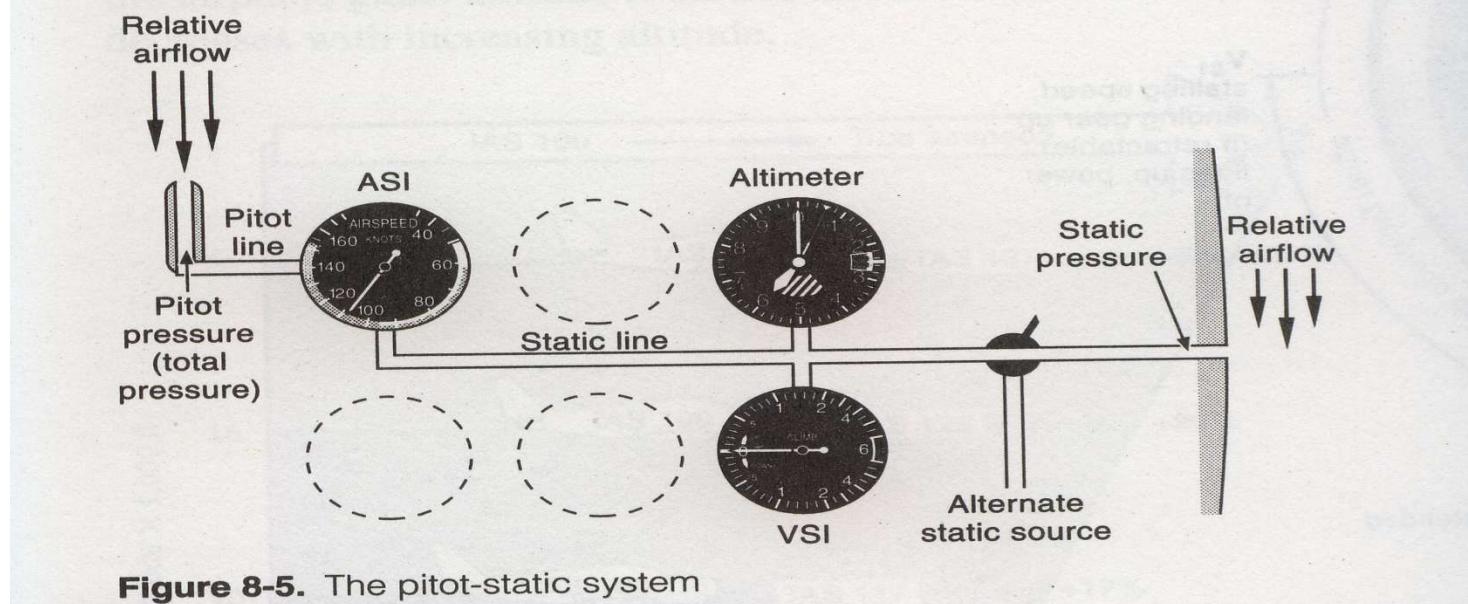


Figure 8-5. The pitot-static system

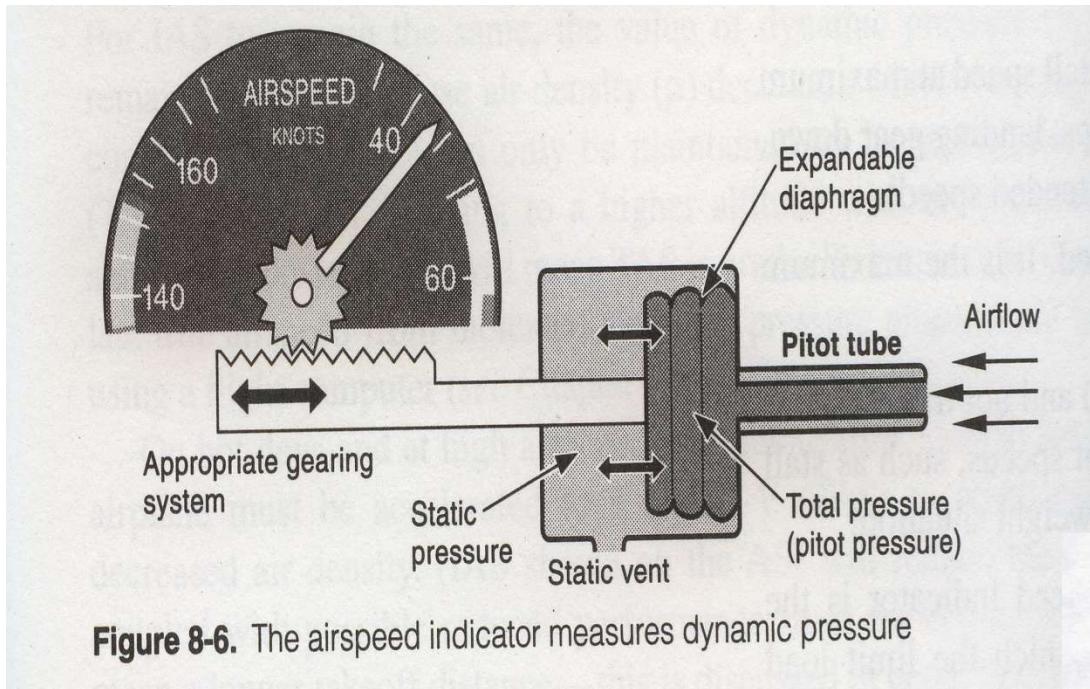


Figure 8-6. The airspeed indicator measures dynamic pressure

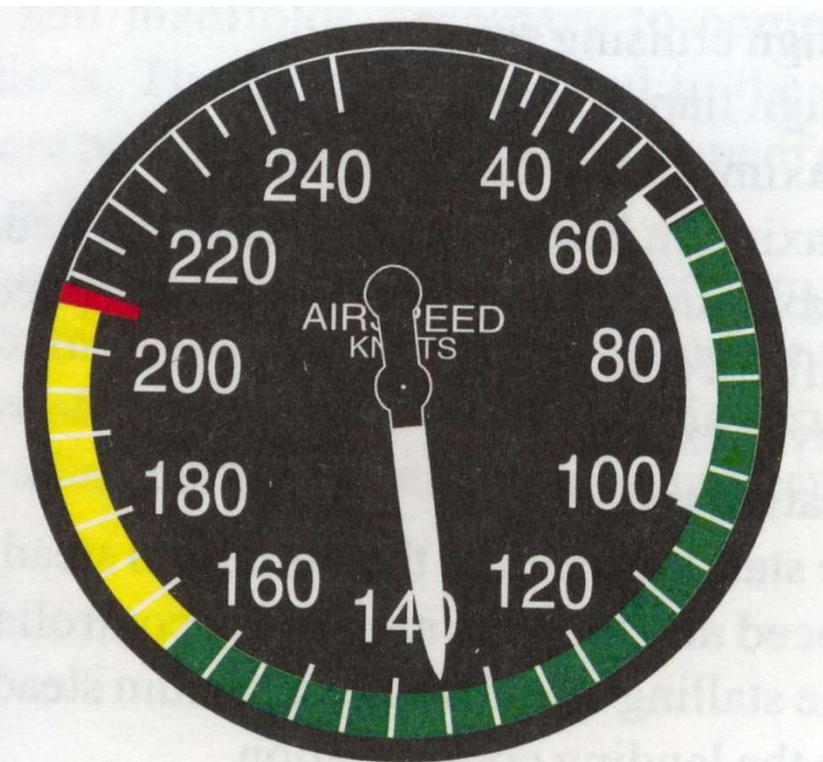
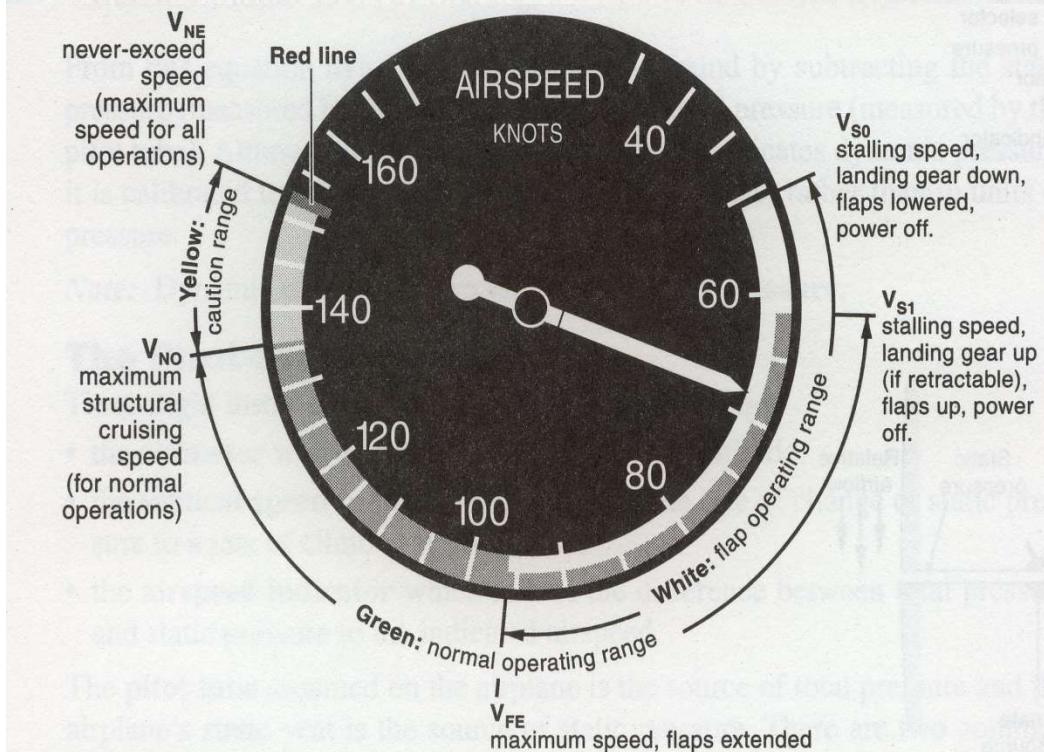


FIGURE 3-4.—Airspeed indicator.

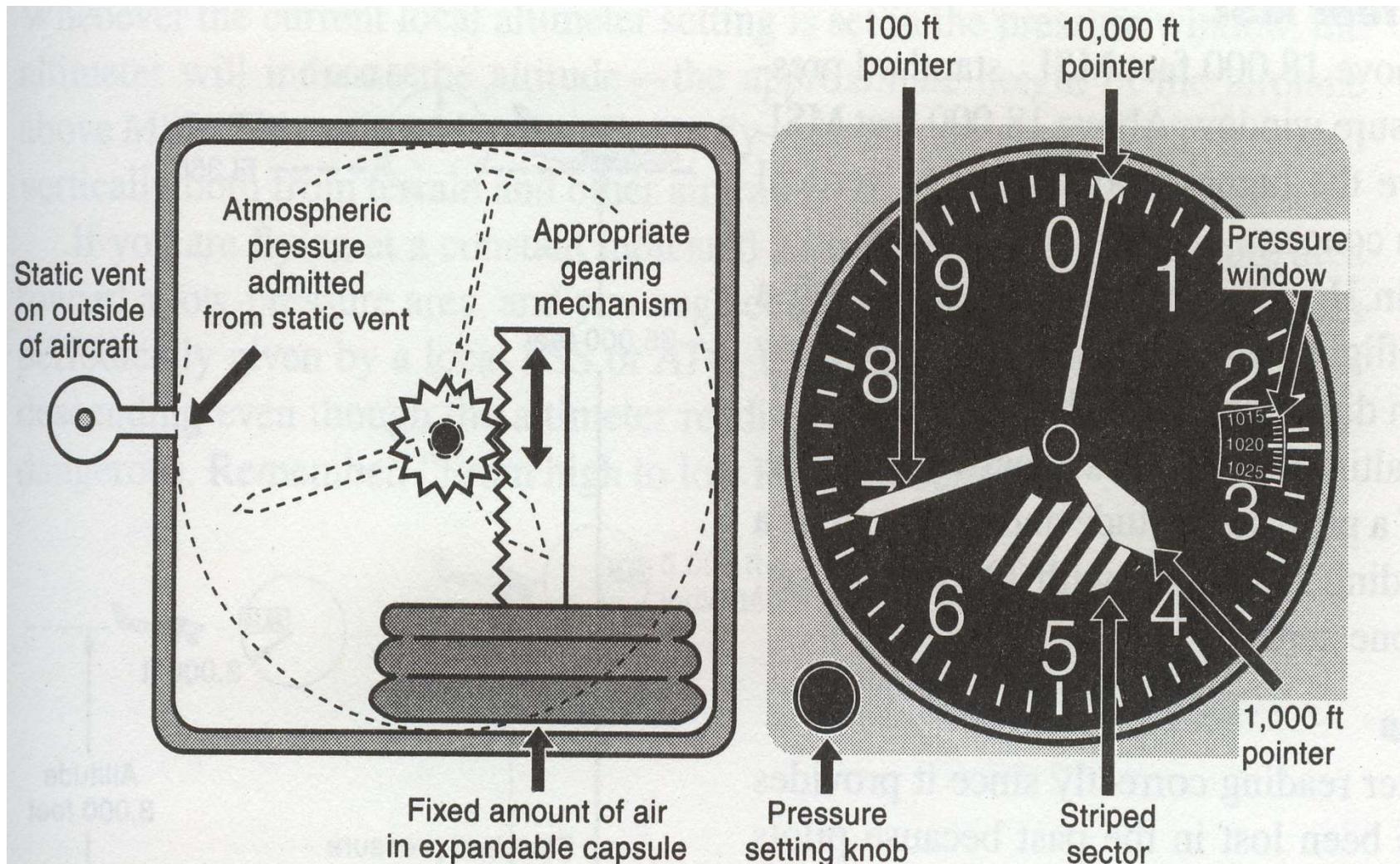
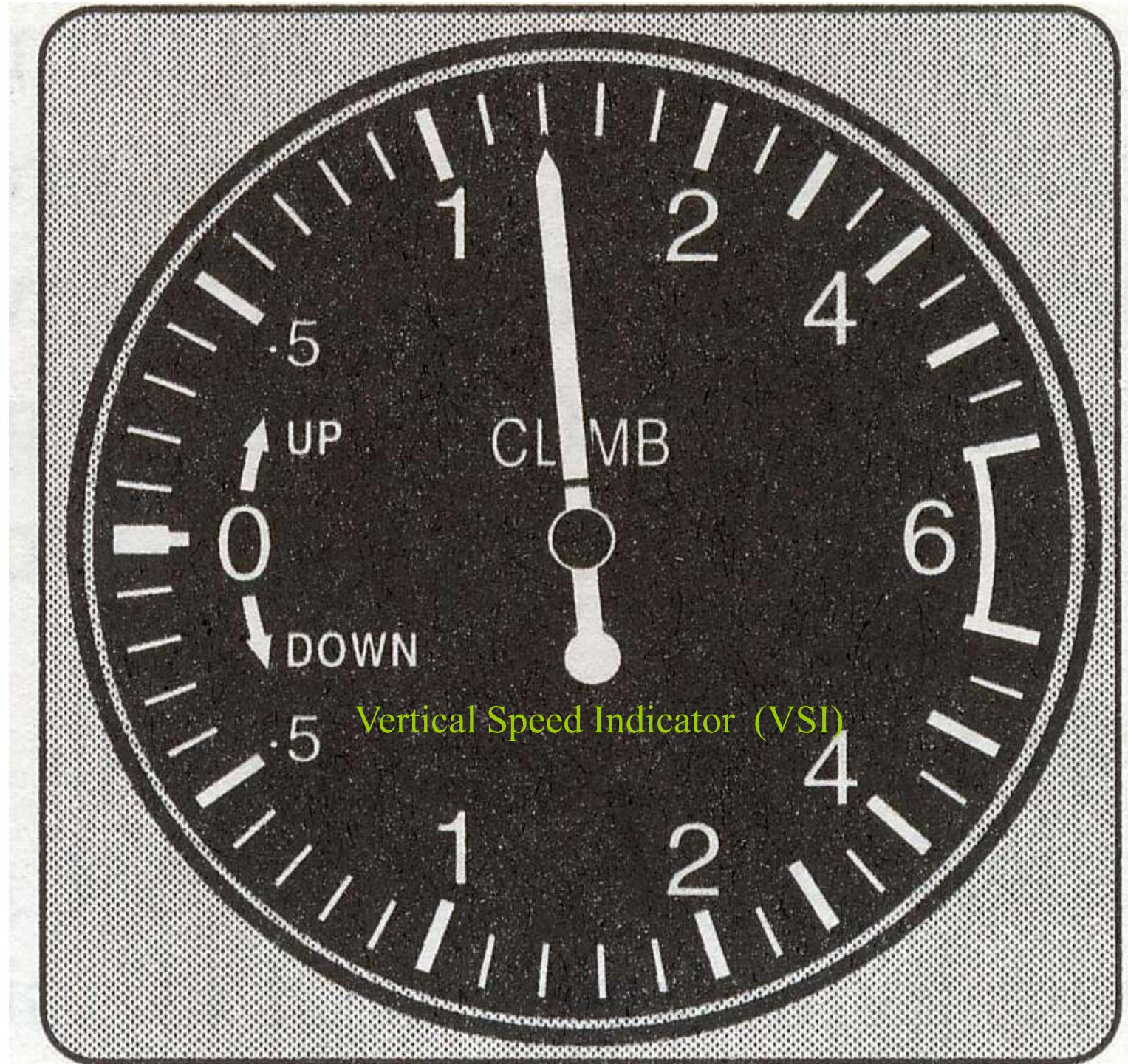
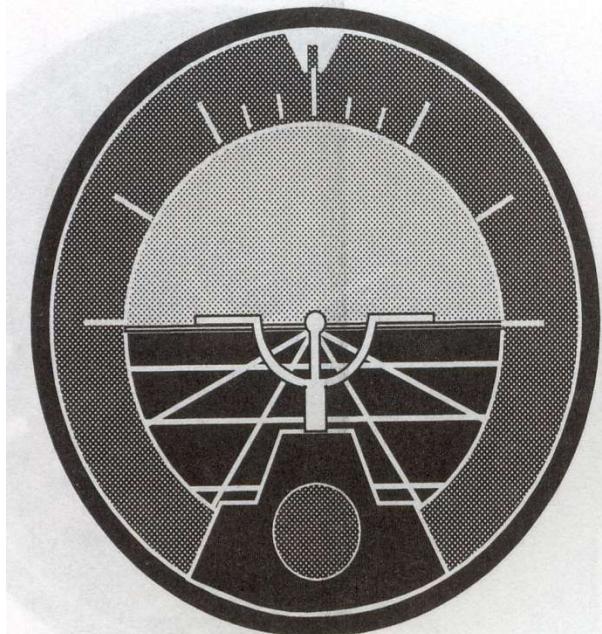
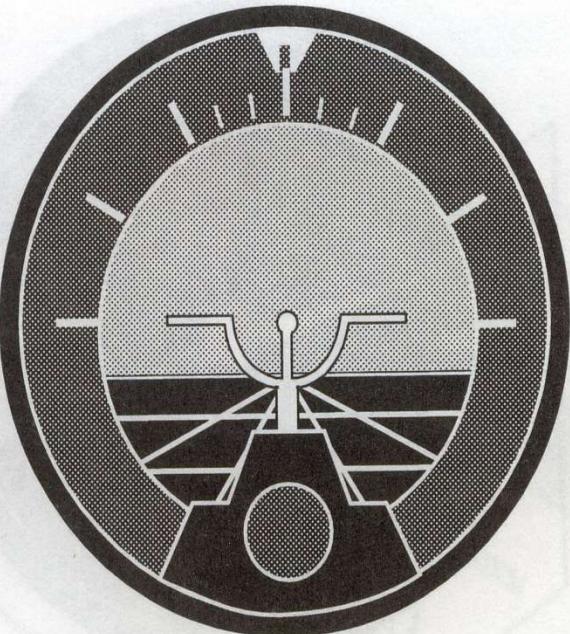


Figure 8-9. The altimeter is a pressure-sensitive instrument

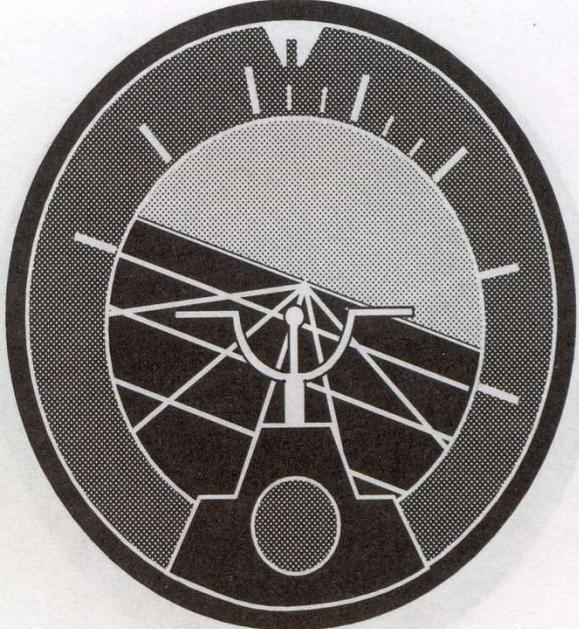




Level Flight



Climb



Descending Left Turn

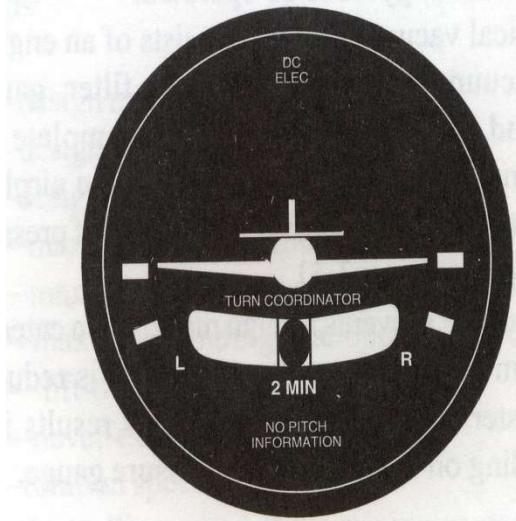


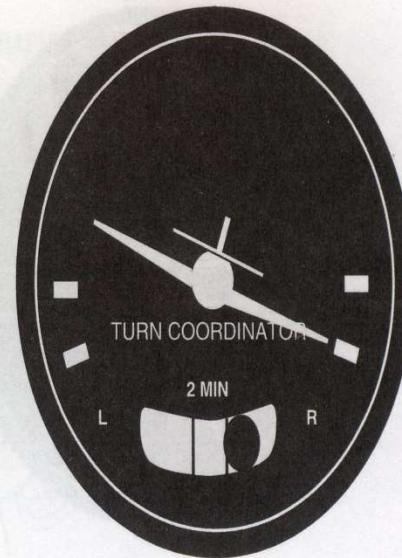
FIGURE 3-7.—Turn coordinator.



Coordinated Turn

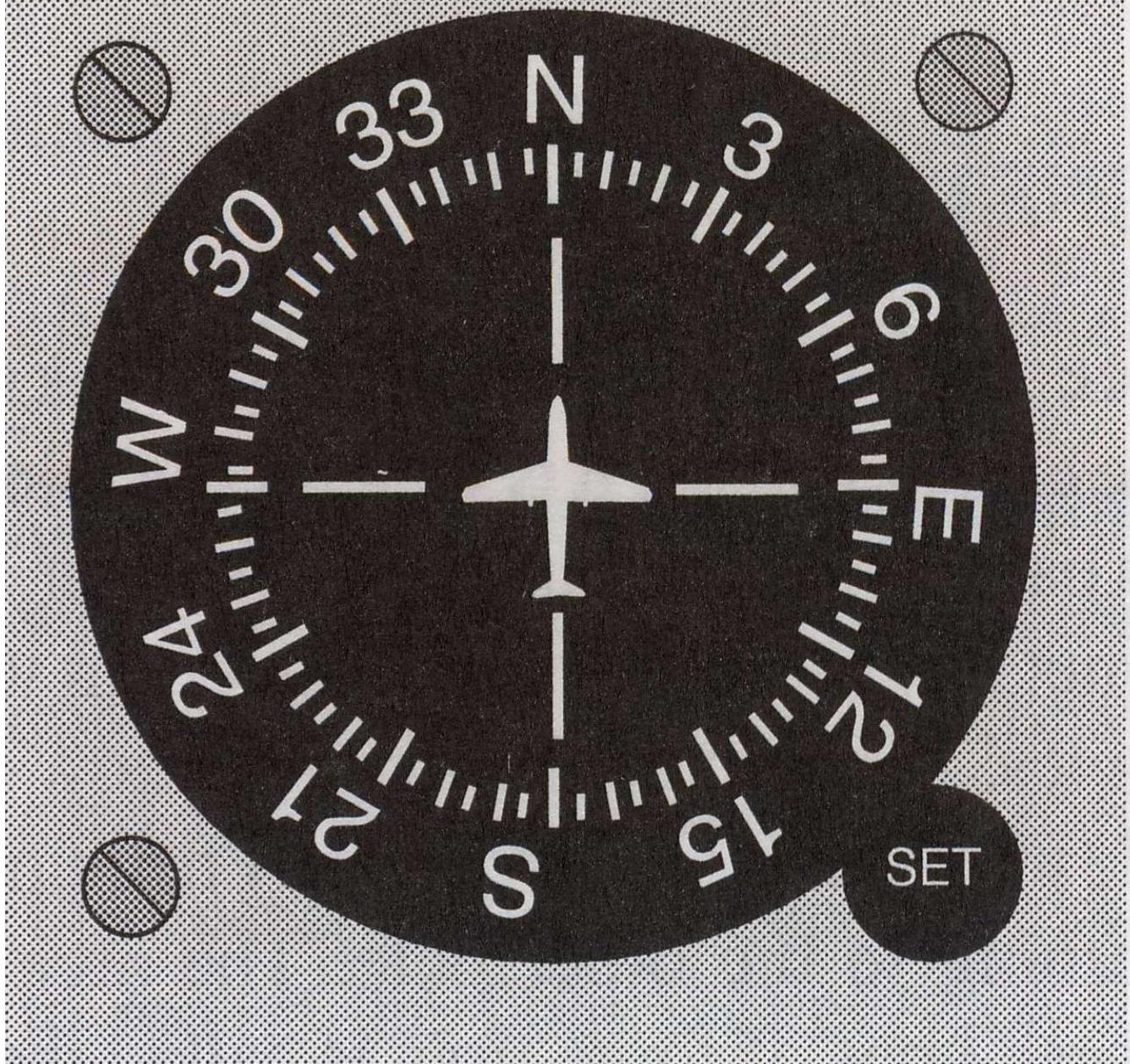


Skid



Slip

Heading Indicator

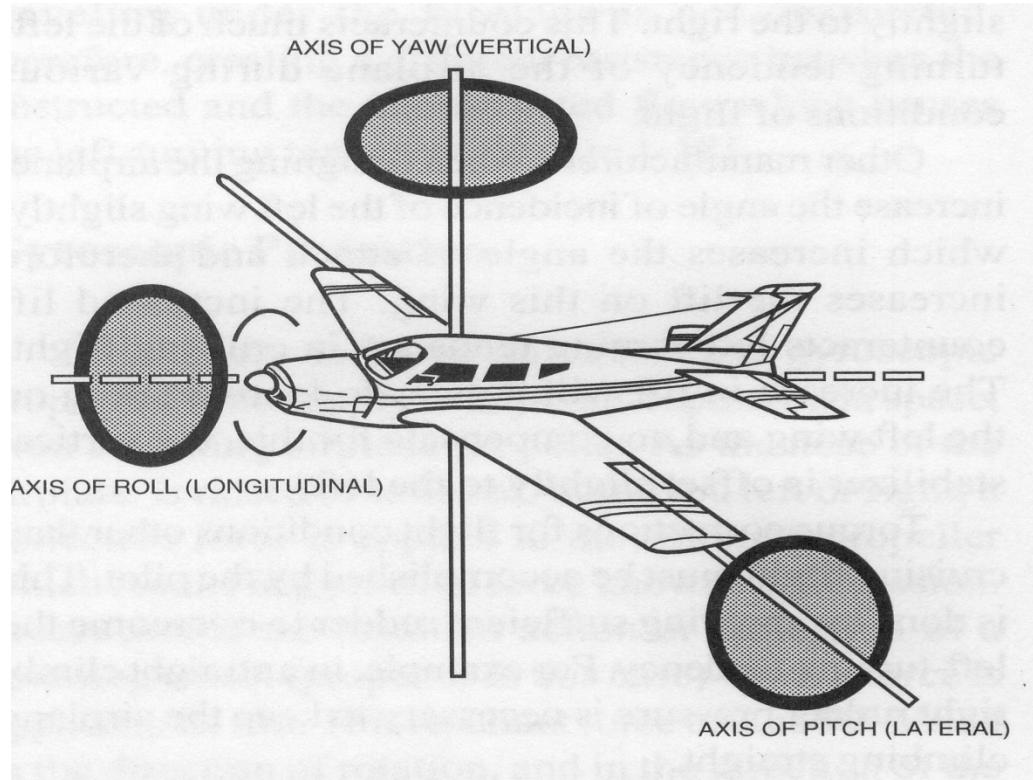


Three Axis of Rotation

Pitch - Elevator – Push or Pull

Roll – Ailerons – Turn Left or Right

Yaw – Rudder – Step Left or Right



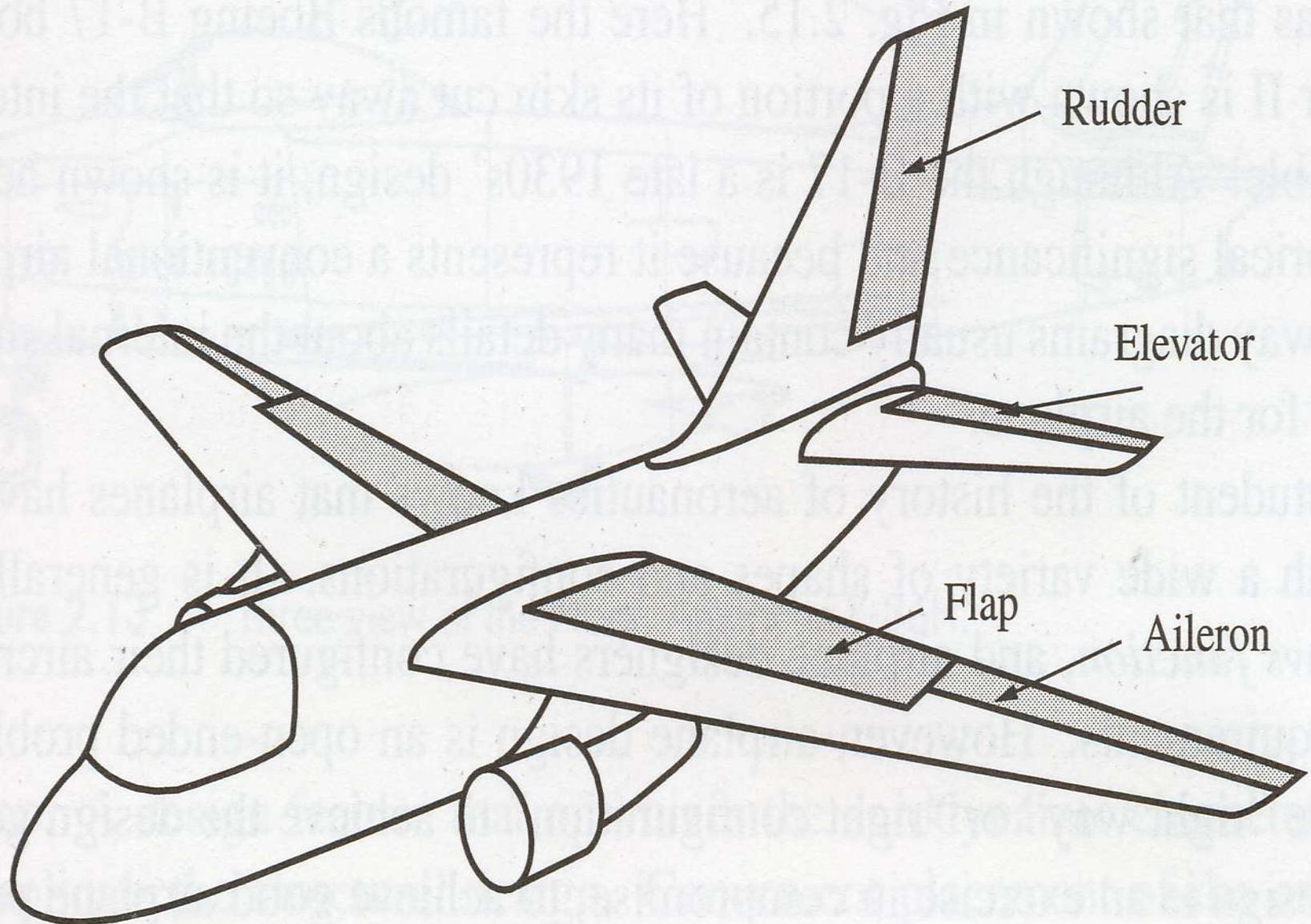
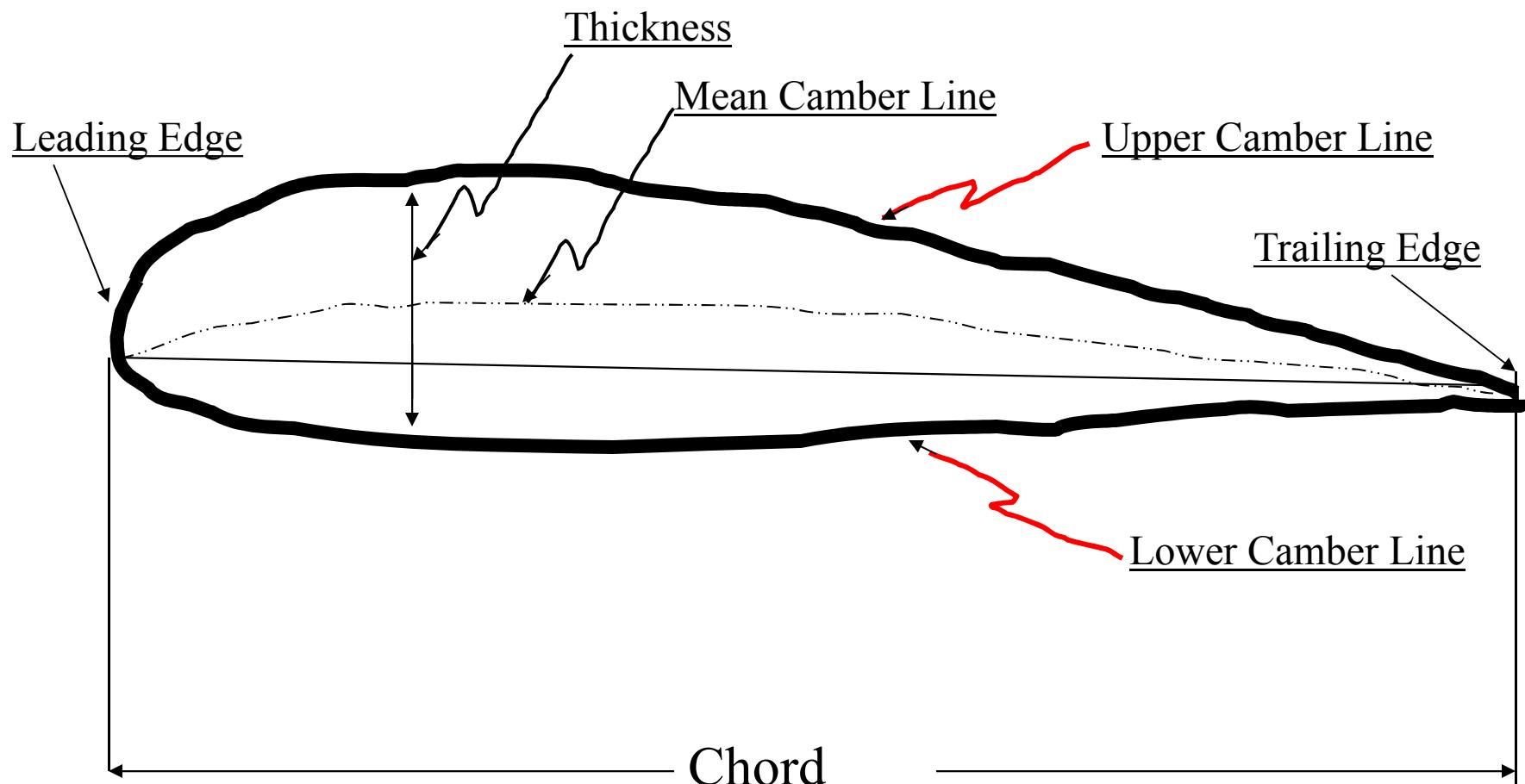
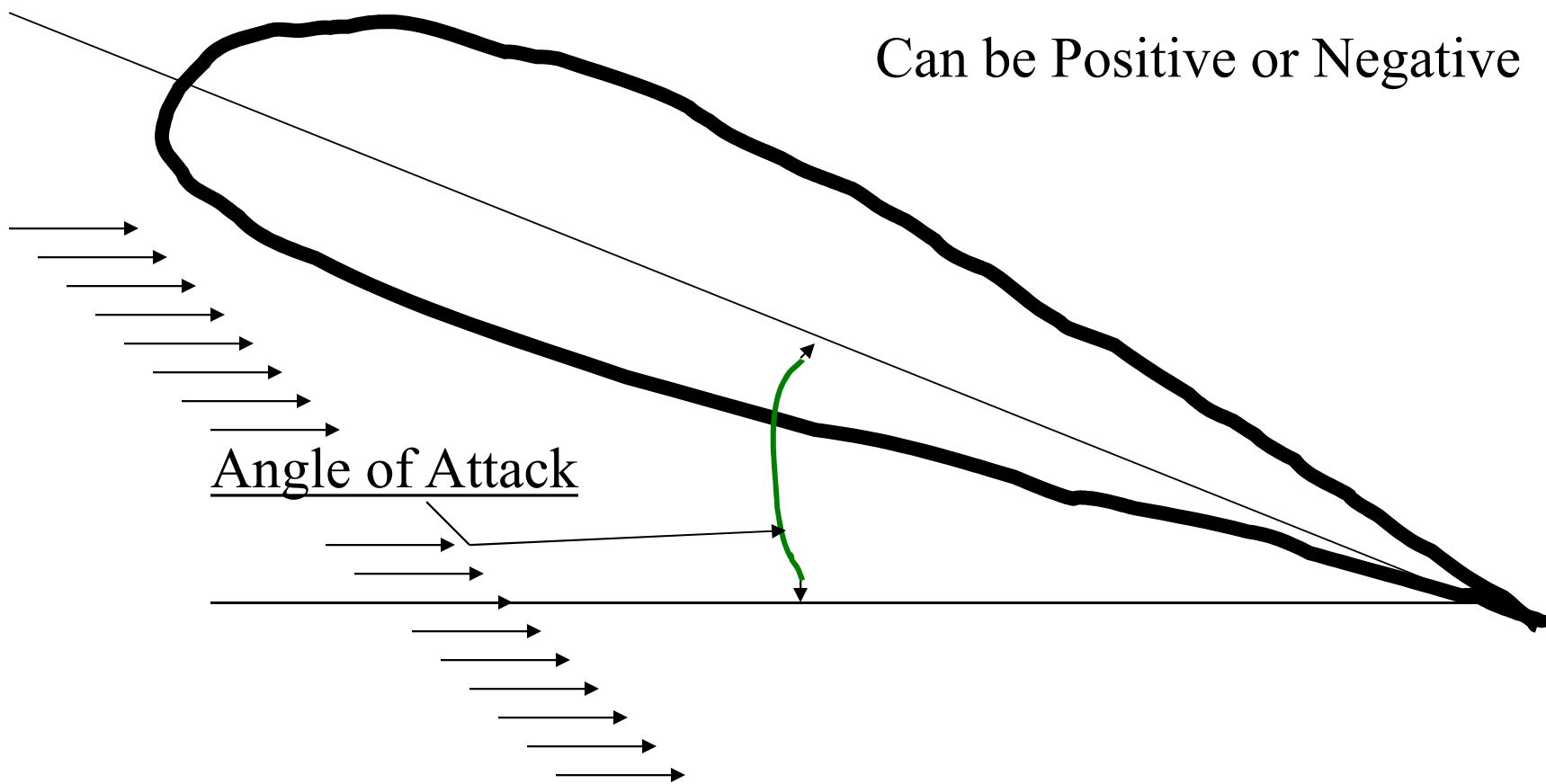


Figure 2.12 Control surfaces and flaps.

NACA Airfoil Nomenclature



Change in Attitude



Turning Moment of an Airfoil

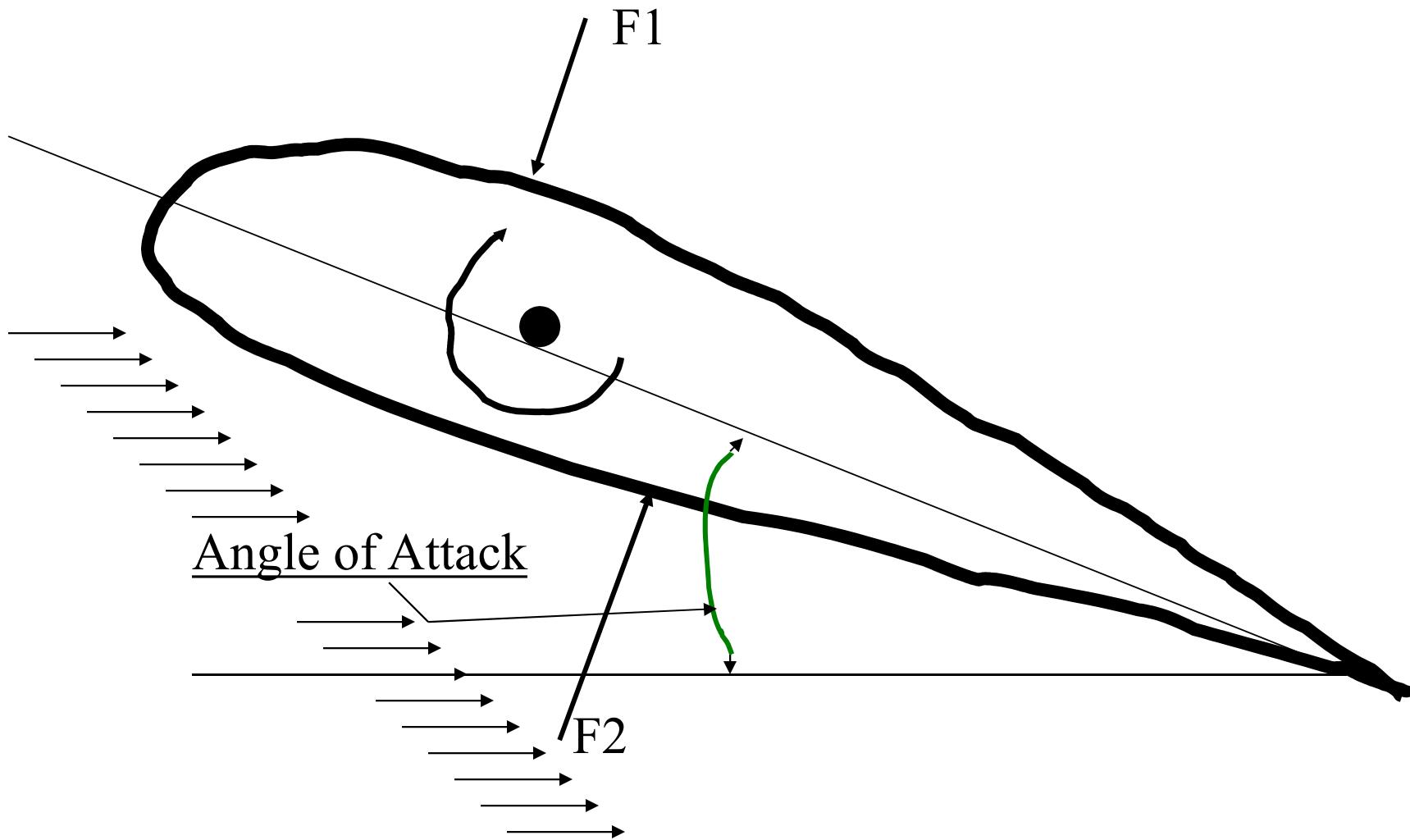




Fig. 6.2 Large-scale model in the 40×80 ft full-scale wind tunnel at NASA Ames Research Center. The use of the three-point support allows the model's angle of attack to be varied. The entire rig appears to be mounted on a turntable, which can be rotated to vary the aircraft's angle of sideslip.

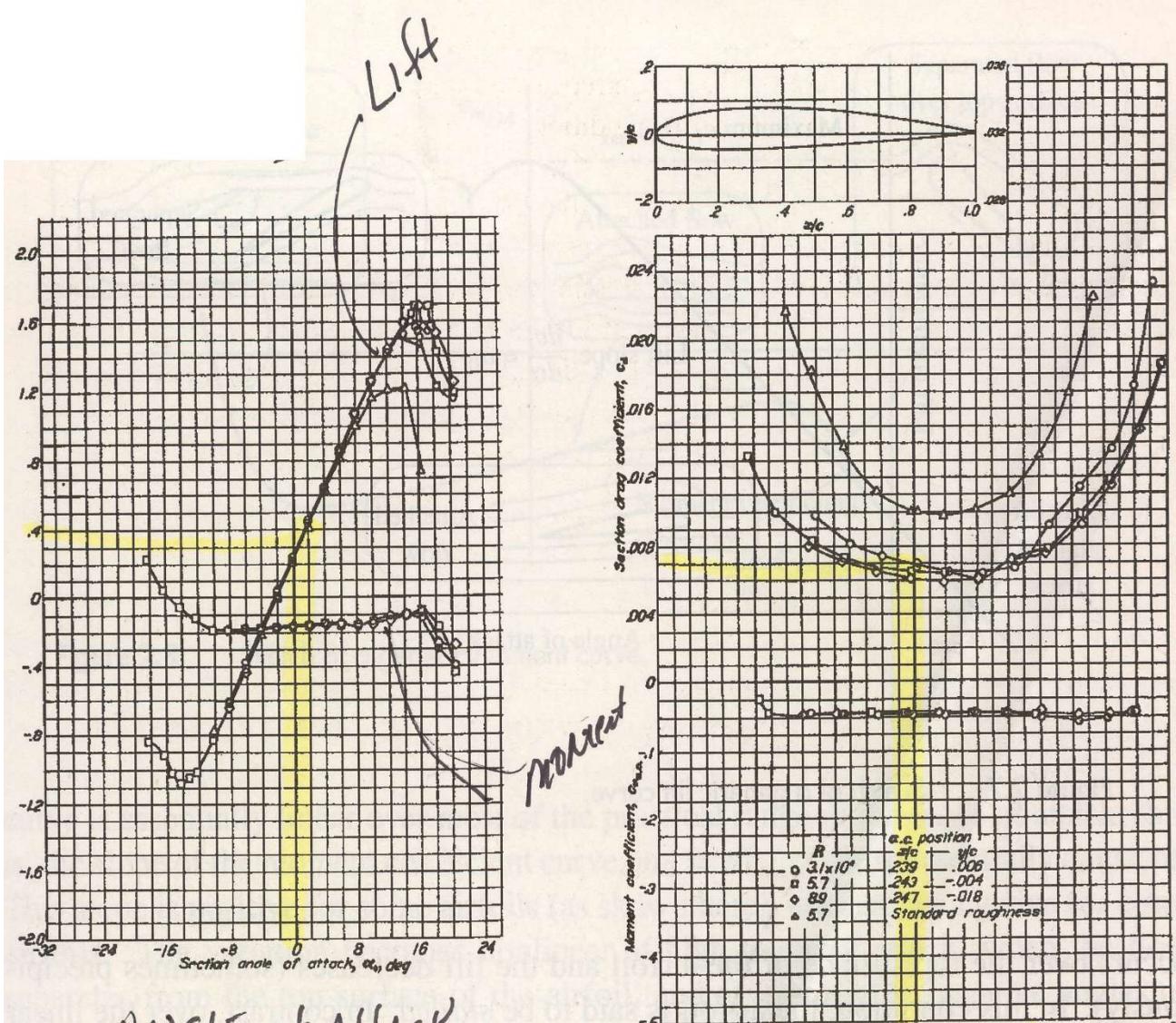


Figure 2.6

Data for the NACA 2412 airfoil. **(a)** Lift coefficient and moment coefficient about the quarter-chord versus angle of attack. **(b)** Drag coefficient and moment coefficient about the aerodynamic center as a function of the lift coefficient. (From Abbott and von Doenhoff, Ref. 19.)

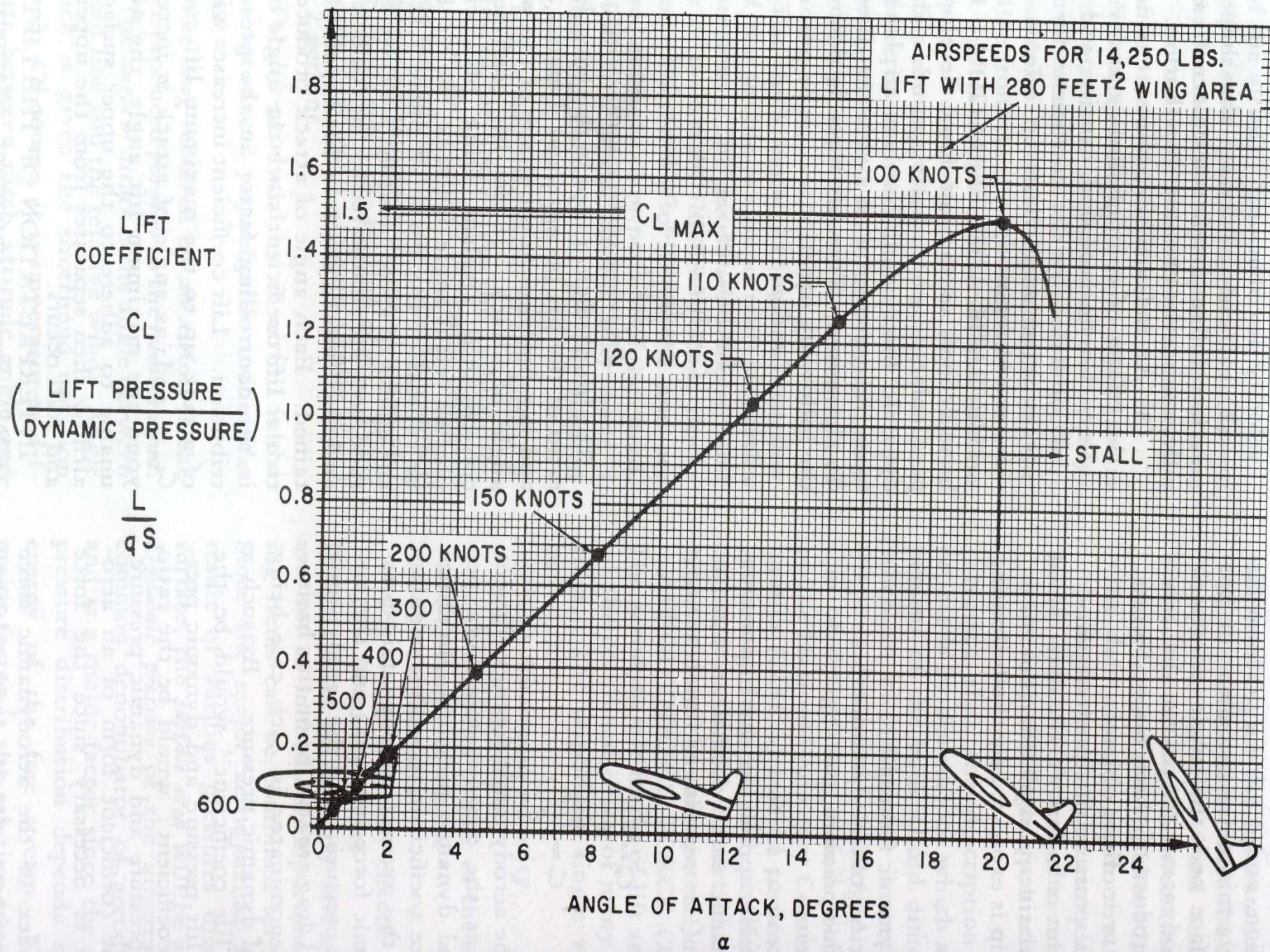


Figure 1.11. Typical Lift Characteristics

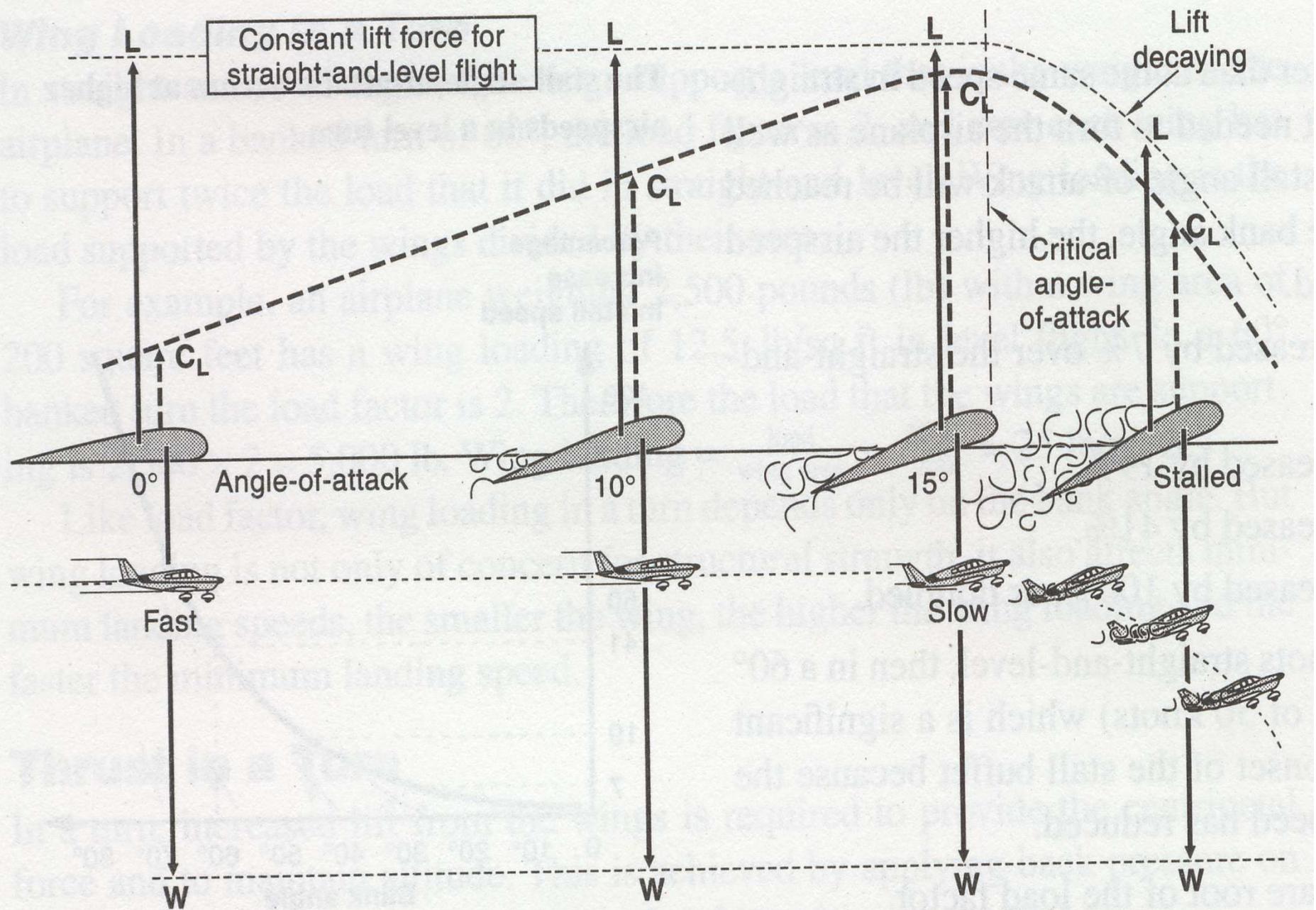


Figure 3-28. An airfoil reaches its maximum lifting ability at the critical angle-of-attack

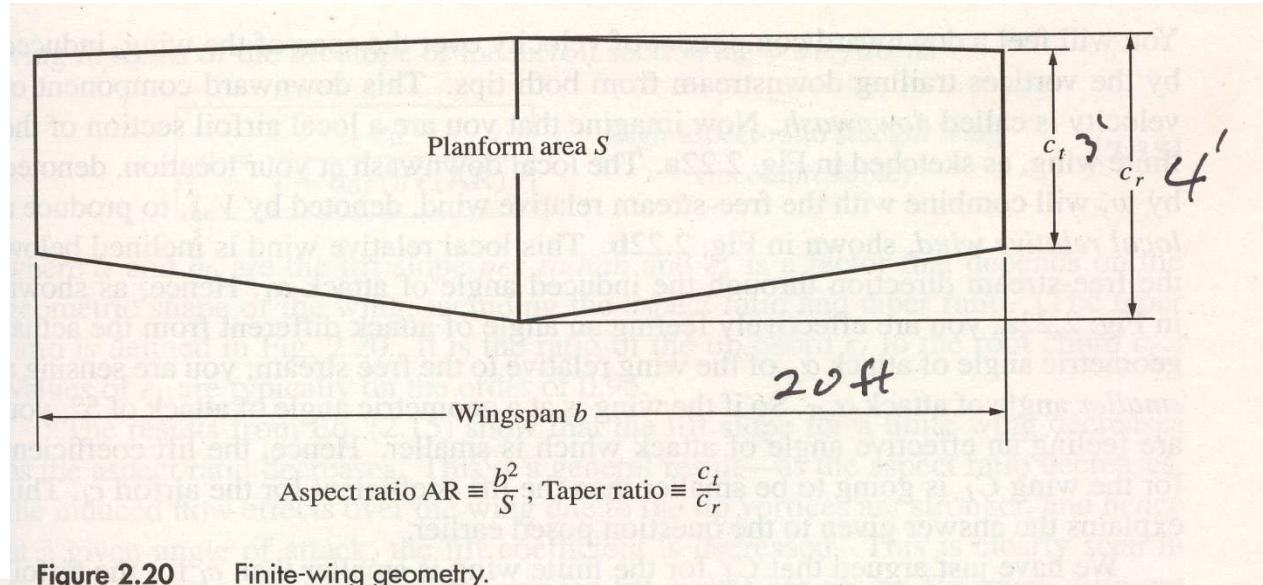


Figure 2.20 Finite-wing geometry.

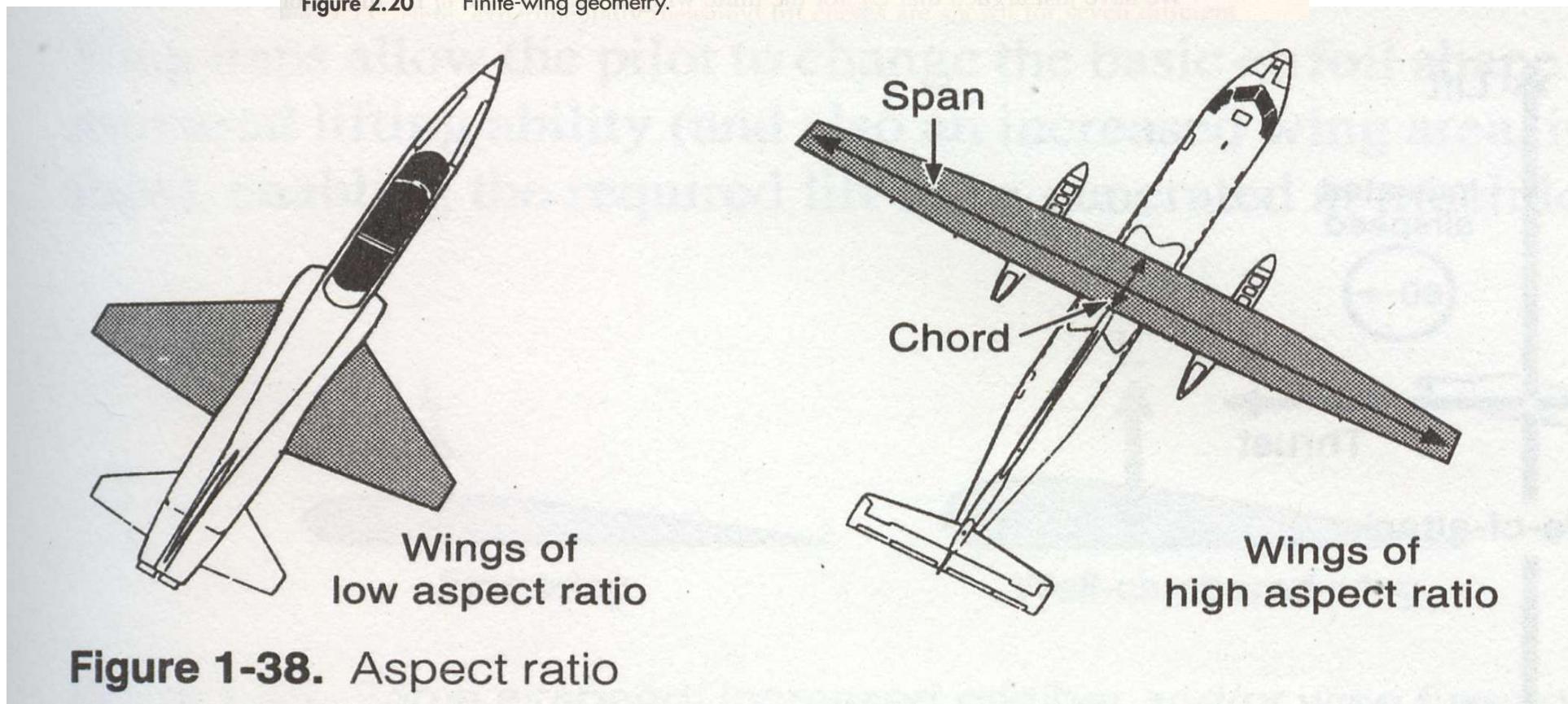


Figure 1-38. Aspect ratio

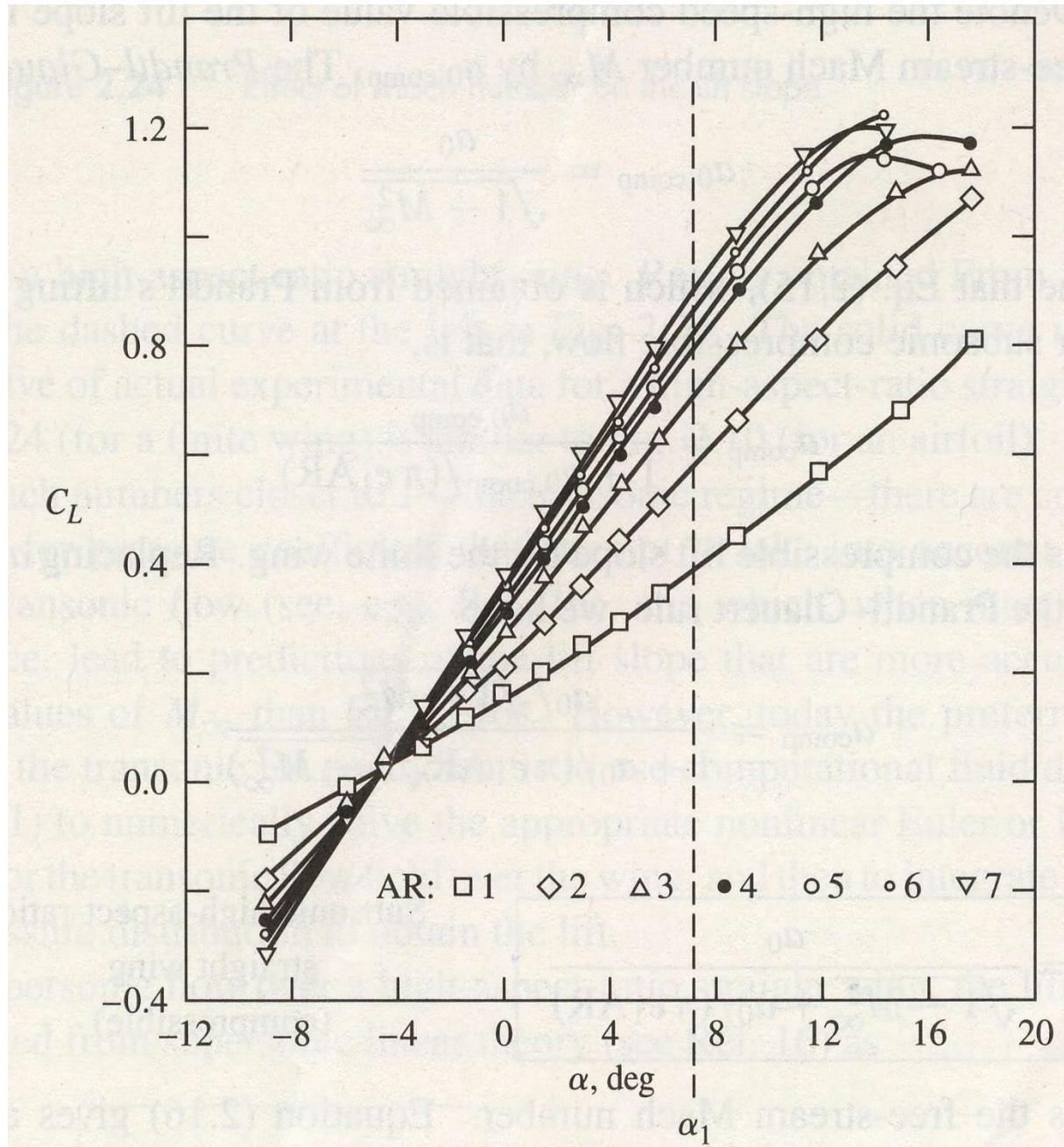
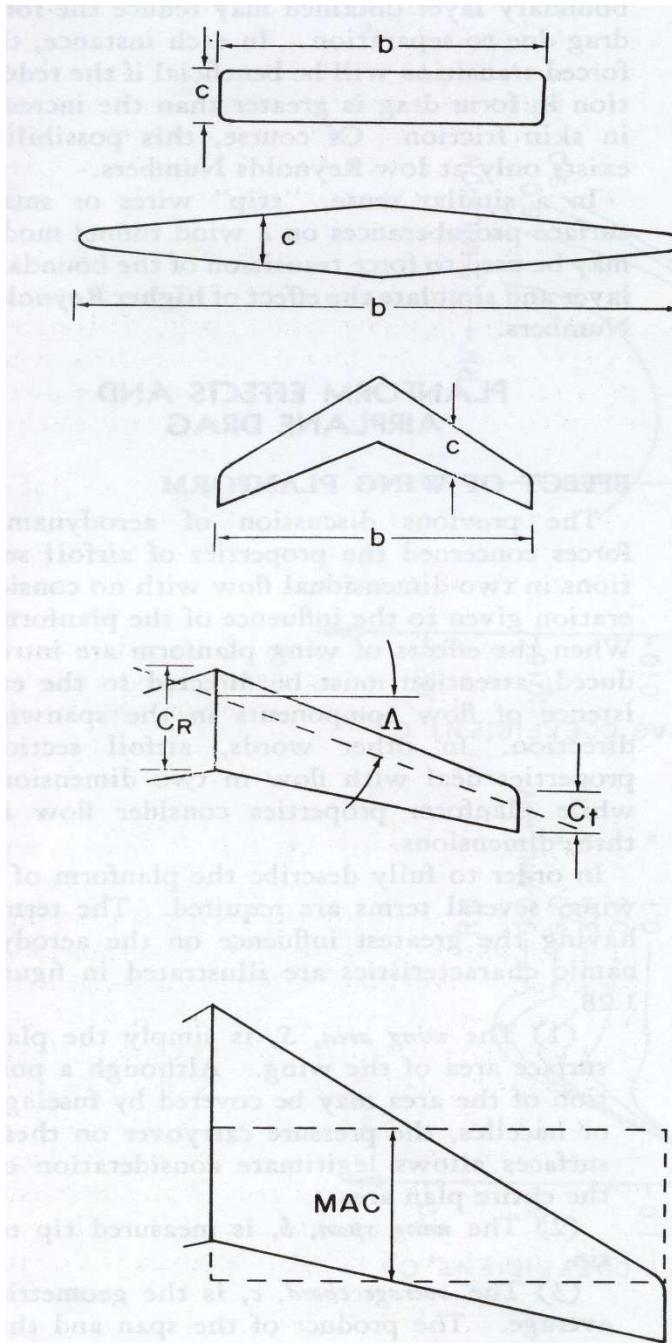


Figure 2.23

Effect of aspect ratio on the lift curve.



S = WING AREA, SQ. FT.

$$S = \frac{b \cdot c}{2}$$

b = SPAN, FT

$$b = \text{Span}$$

c = AVERAGE CHORD, FT

$$c = \frac{b}{AR}$$

AR = ASPECT RATIO

$$AR = \frac{b}{c}$$

$$AR = \frac{b^2}{S}$$

CR = ROOT CHORD, FT

$$CR = \text{Root Chord}$$

CT = TIP CHORD, FT

$$CT = \text{Tip Chord}$$

λ = TAPER RATIO

$$\lambda = \frac{CT}{CR}$$

Δ = SWEEP ANGLE, DEGREES

$$\Delta = \text{Sweep Angle}$$

MAC = MEAN AERODYNAMIC CHORD

$$MAC = \frac{b}{2}$$

Figure 1.28. Description of Wing Planform

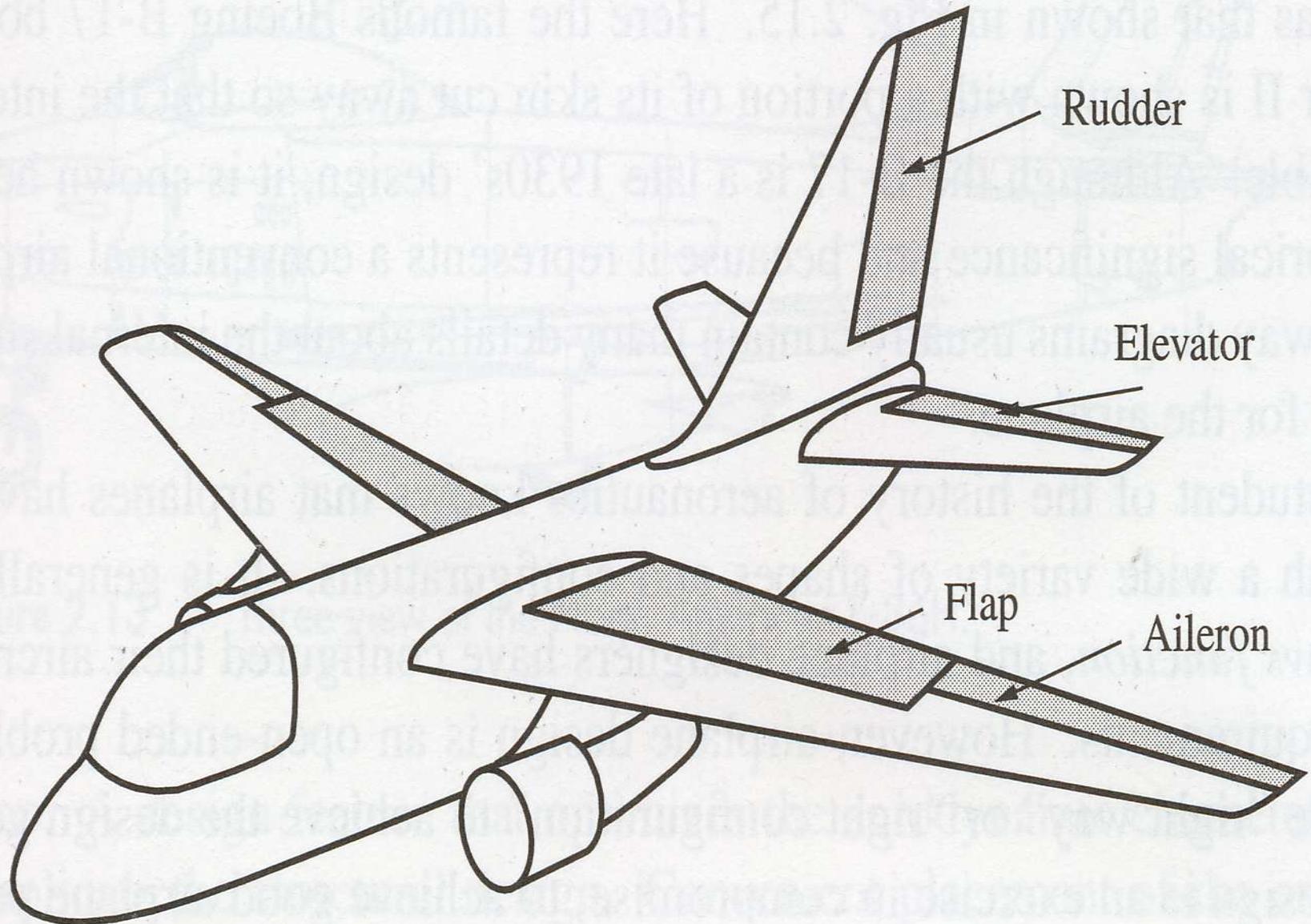


Figure 2.12 Control surfaces and flaps.

