

## What's In Our Toolbox So Far?

- Four aerodynamic quantities, flow field
- Steady vs unsteady flow
- Streamlines
- Two sources of all aerodynamic forces
- Equation of state for perfect gas
- Standard atmosphere: six different altitudes
- Hydrostatic equation
- Linear interpolation, local approximation
- Lift due to buoyancy
- Viscous vs inviscous flow

## Toolbox Second Drawer

- Airfoil and airplane nomenclature
- Continuity (conservation of mass)
- Compressible vs incompressible
- Momentum equation (Euler's equation)
- Momentum equation (Bernoulli's equation)
- Subsonic wind tunnel calculations
- Manometer
- Pitot tube, Pitot-static tube
- Total, static, and dynamic pressure
- Venturi tube

## Toolbox Third Drawer

- Lift, Drag, and Moment
- Lift, Drag, and Moment Coefficients
- Drag Polar
- Equations of motion
- Straight and level flight
  - thrust required
  - max L/D
- Roll, pitch and yaw
- Stability in straight and level flight
  - $C_{M_\alpha} < 0$  for stability