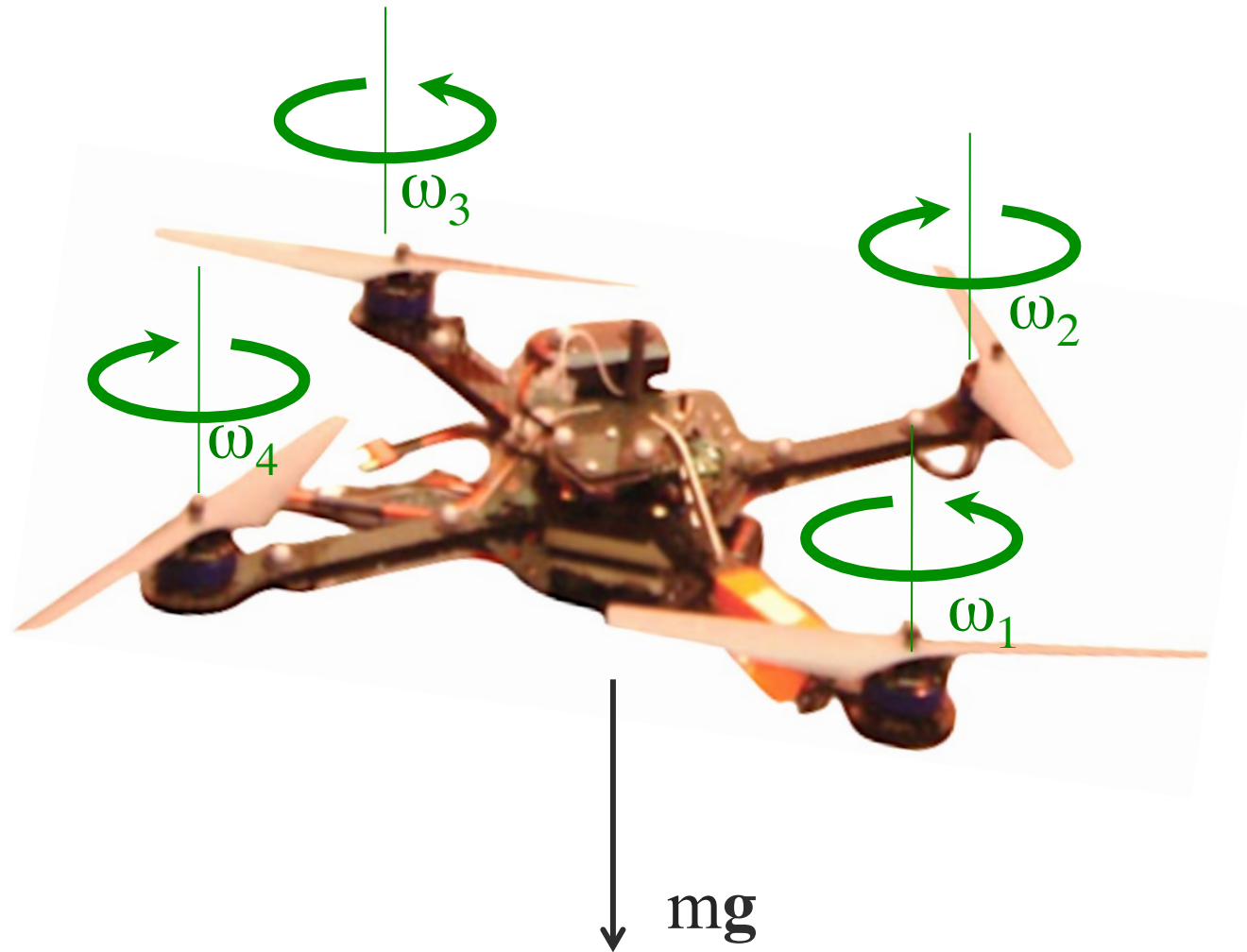


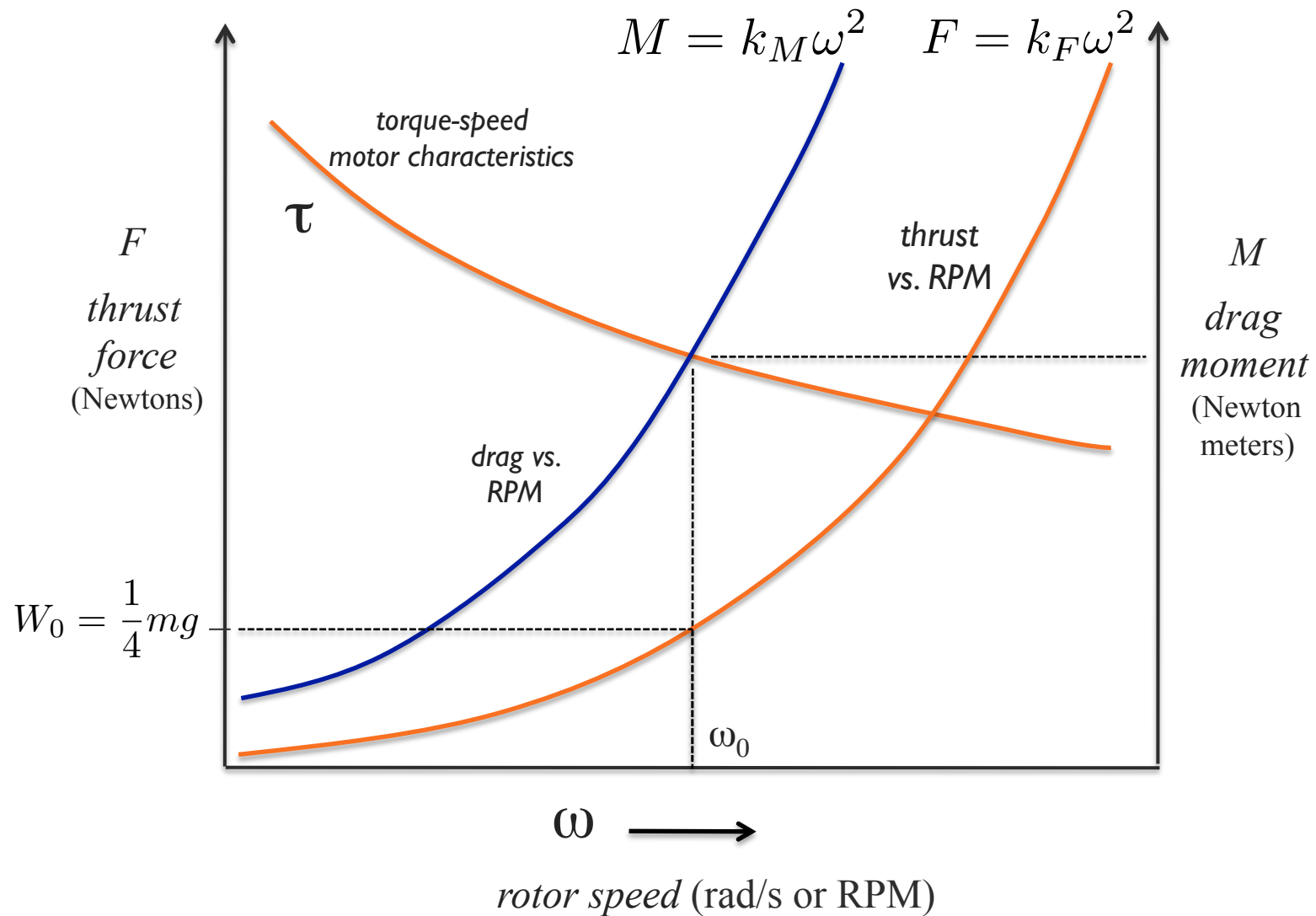
Goals

- Basic mechanics
- Control
- Design considerations
- Agility
- Component selection
- Effects of size

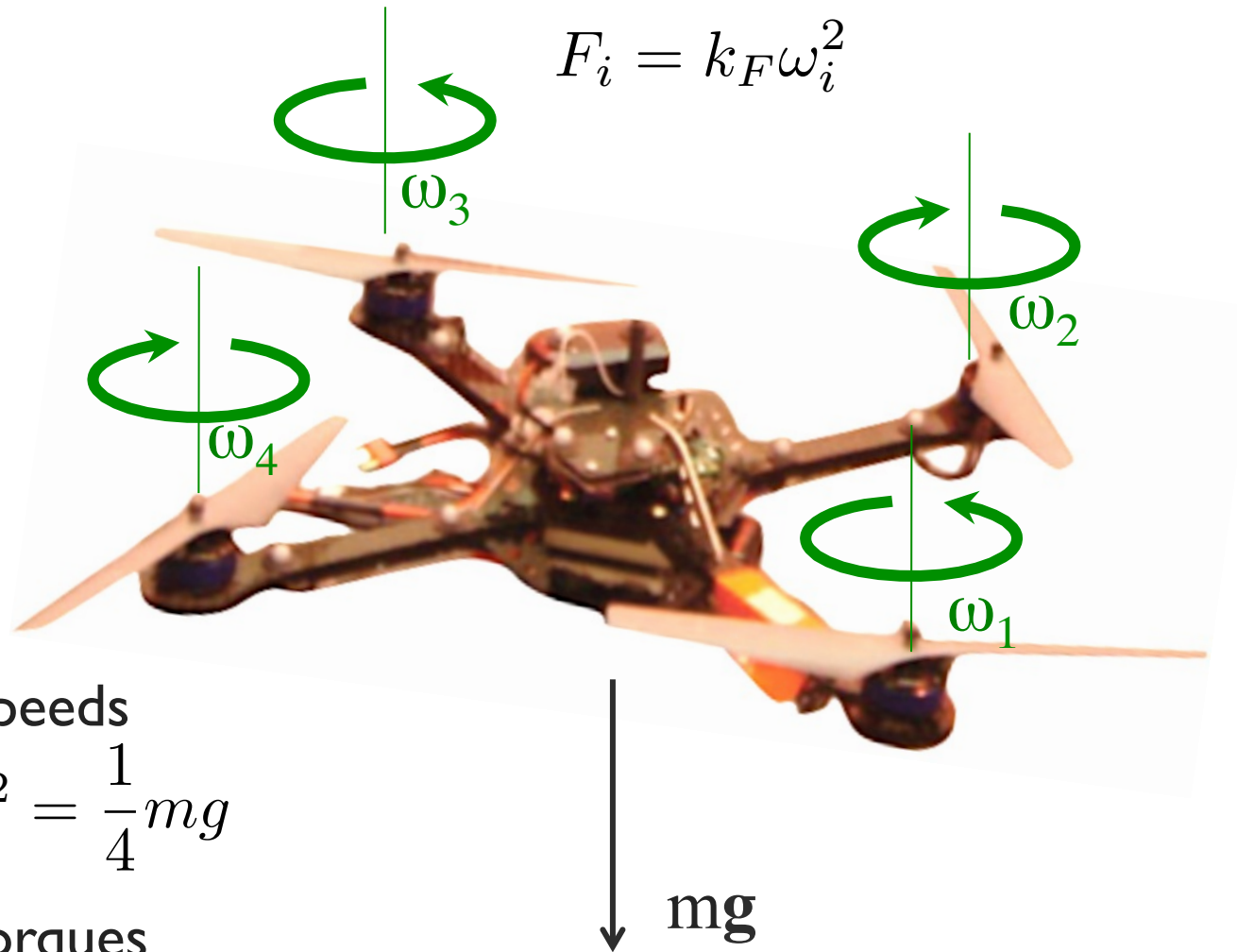
Basic Mechanics



Rotor Physics

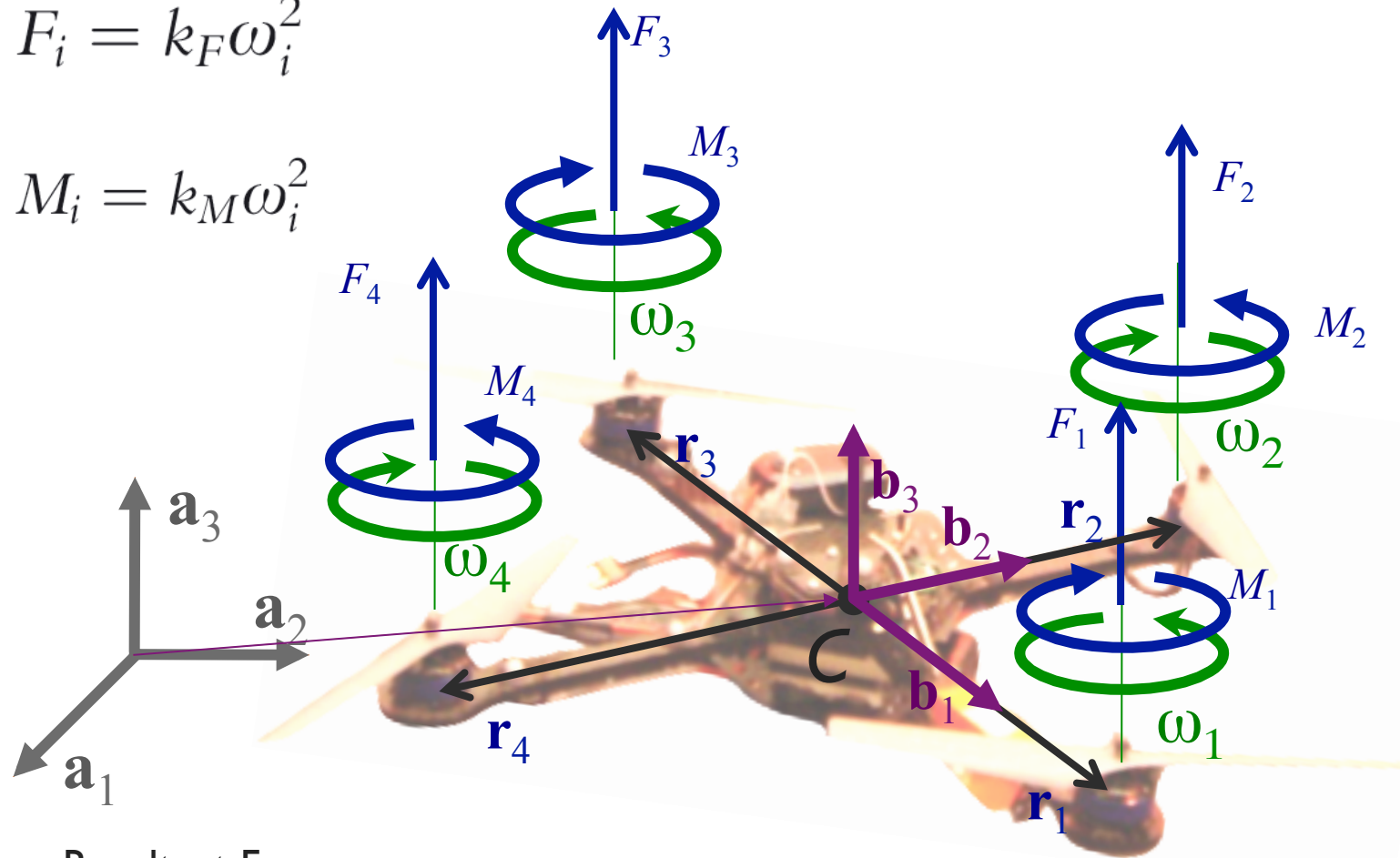


Basic Mechanics (Hover)



$$F_i = k_F \omega_i^2$$

$$M_i = k_M \omega_i^2$$



Resultant Force

$$\mathbf{F} = \mathbf{F}_1 + \mathbf{F}_2 + \mathbf{F}_3 + \mathbf{F}_4 - m g \mathbf{a}_3$$

Resultant Moment

$$\begin{aligned} \mathbf{M} = & \mathbf{r}_1 \times \mathbf{F}_1 + \mathbf{r}_2 \times \mathbf{F}_2 + \mathbf{r}_3 \times \mathbf{F}_3 + \mathbf{r}_4 \times \mathbf{F}_4 \\ & + \mathbf{M}_1 + \mathbf{M}_2 + \mathbf{M}_3 + \mathbf{M}_4 \end{aligned}$$

Acceleration (in the vertical direction)

