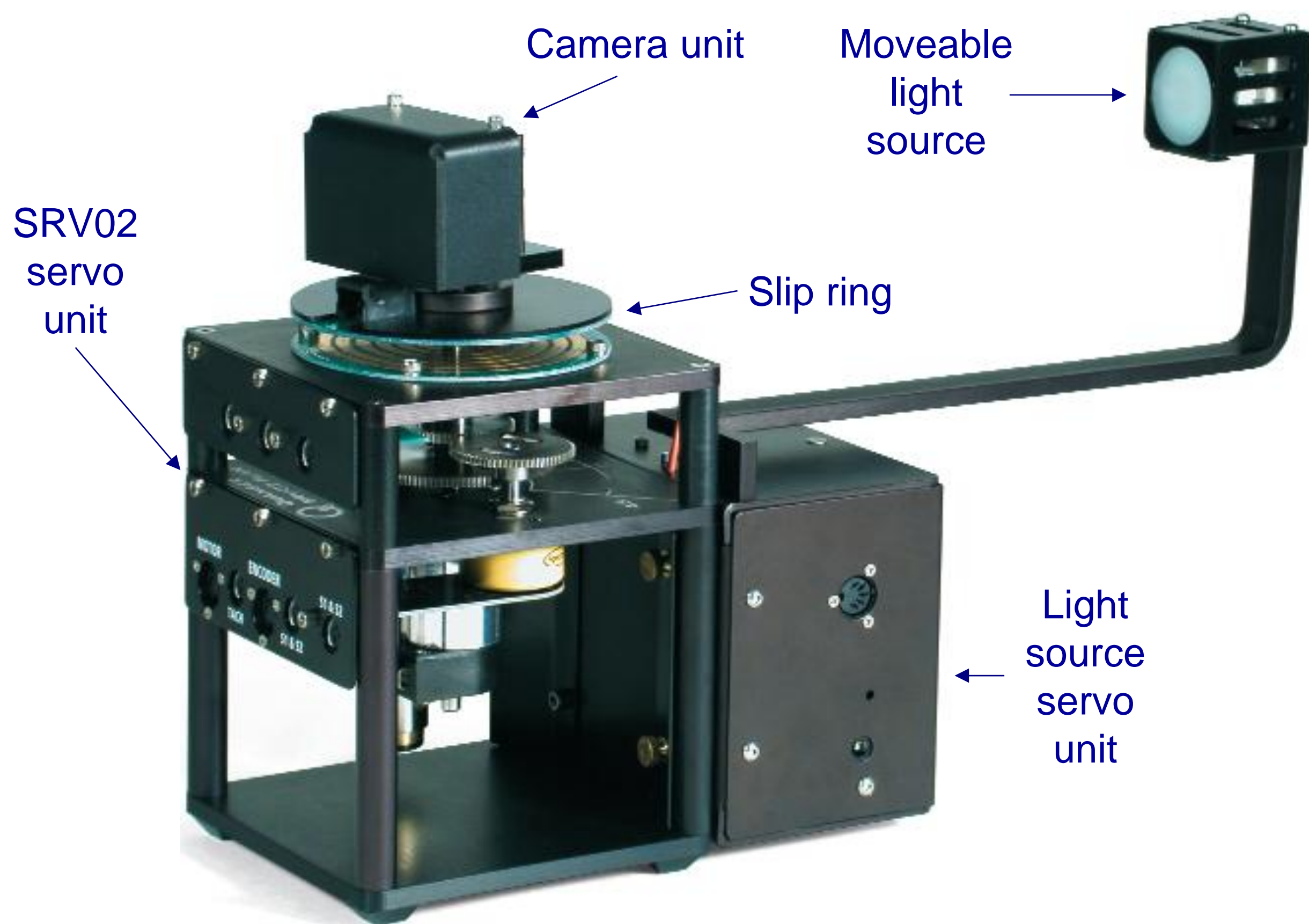


Solar Tracker



The Quanser Solar Tracker plant consists of a moveable (controllable) light source module, and SRV02 servo with the camera mounted on top of a slip ring coupled to servo's motor load shaft (which allows the camera to rotate 360°).

The user can control the angular position and speed of the light source as well as the brightness of the bulb.

The camera's outputs are right and left sensor allowing to calculate its orientation with respect to a light source. The SRV02 system is comprised of a dc motor with a planetary gearbox that drives external gears. It includes a tachometer to measure motor speed as well as an optical encoder and a potentiometer to measure the position of the load gear.

The objective is to develop a feedback system (PID controller) that controls the position of the camera to track the moving light source.

Requirements

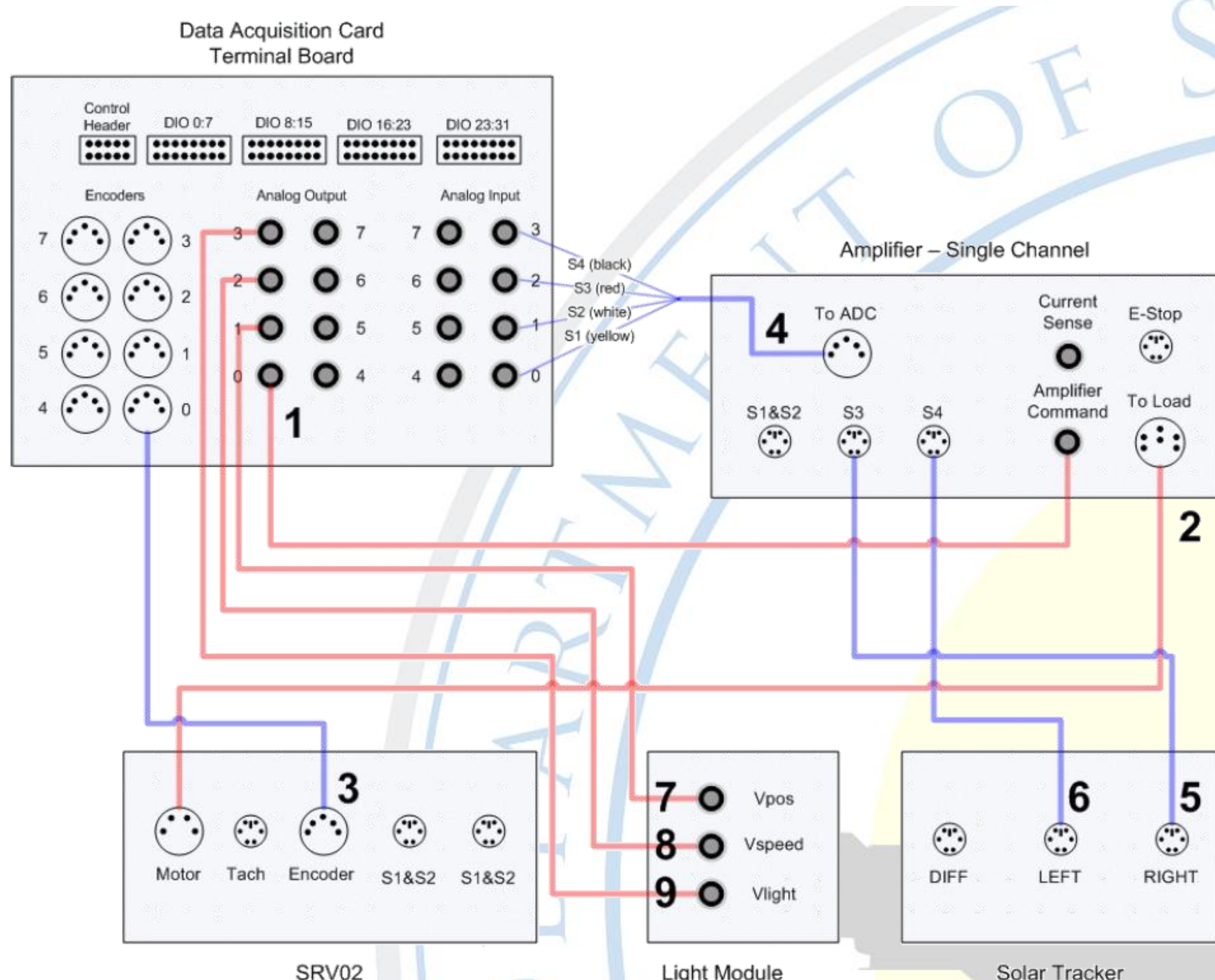
Transient response peak time: $t_p \leq 0.2s$
 Maximum percent overshoot: $M_p \leq 5\%$
 Steady-state error: $e_{ss}^{step} = 0$

$$\zeta = 0.69 \quad \omega_n = 21.7s^{-1}$$

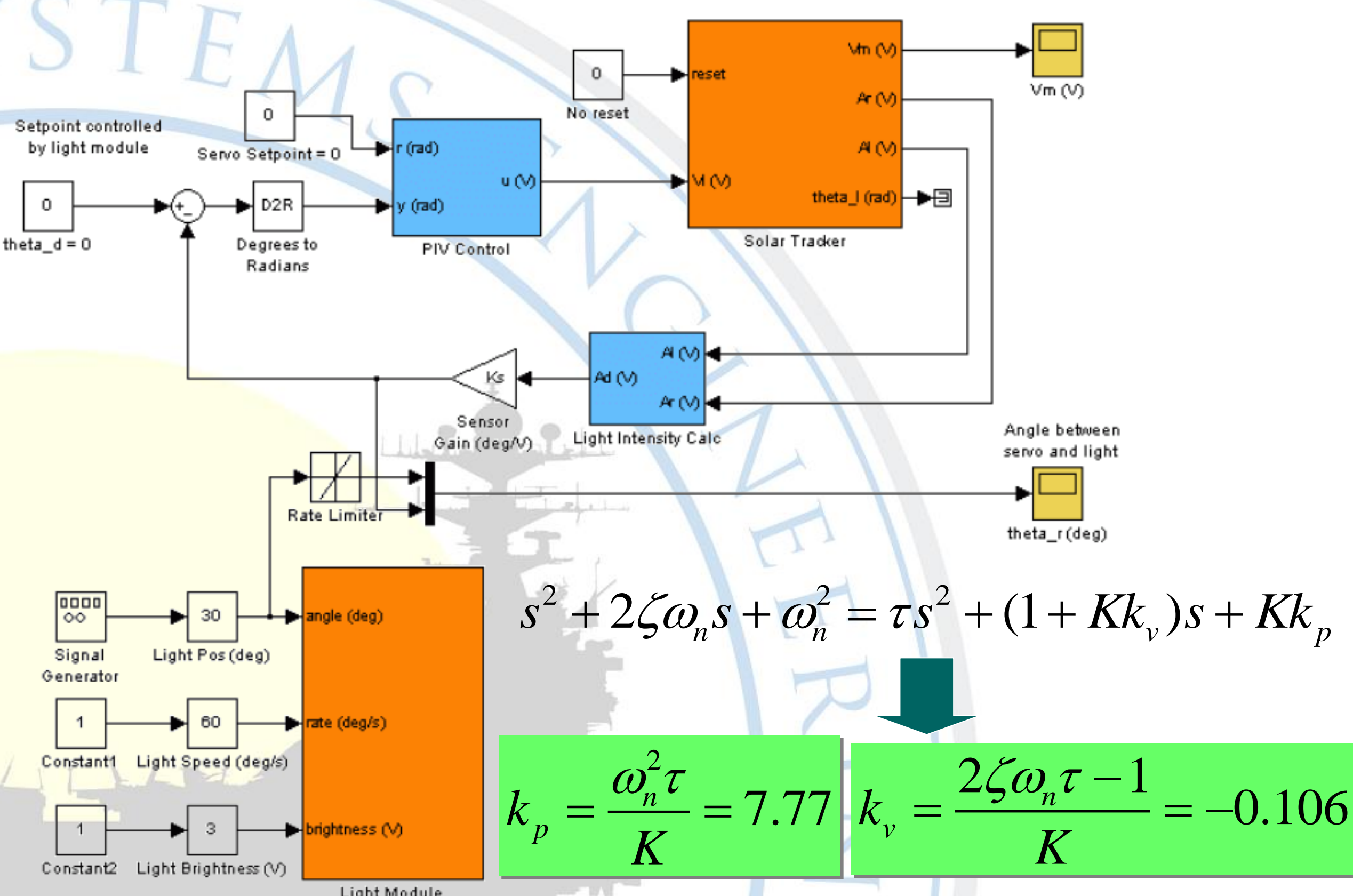
SRV02 Model

$$P_s(s) = \frac{\Theta_l(s)}{V_m(s)} = \frac{K}{s(\tau s + 1)} = \frac{1.67}{s(0.0275s + 1)}$$

Setup schematics



Simulink block diagram



Military/Navy Applications

