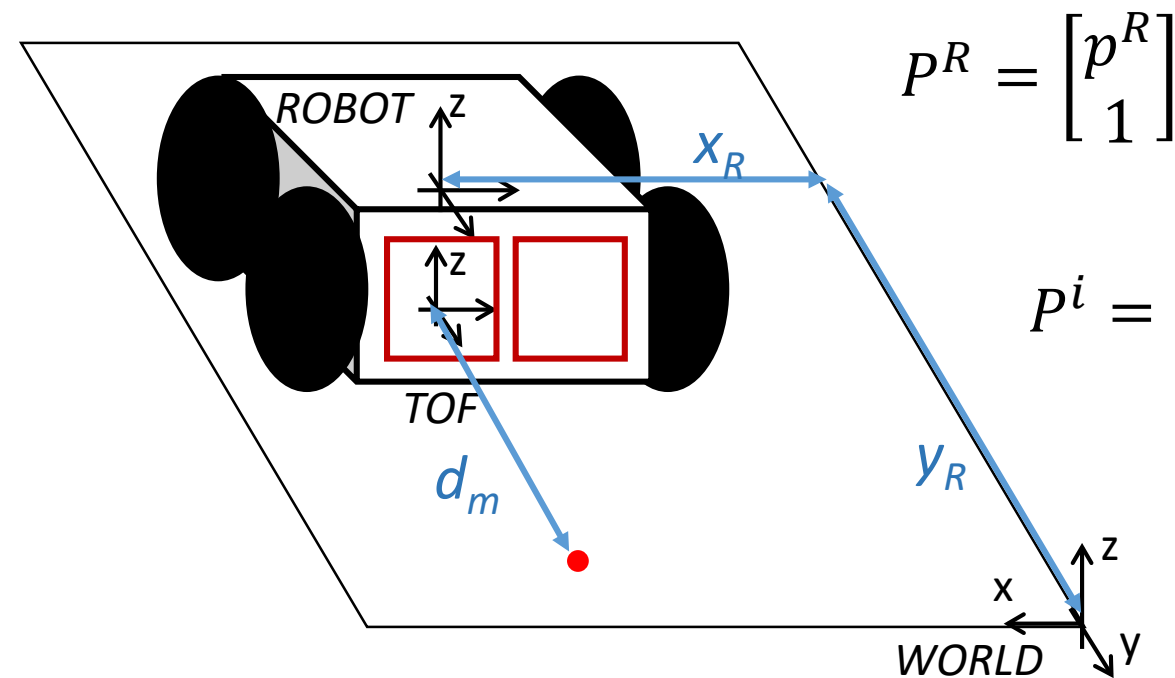


Task: Identify ϕ , θ , and ψ and build T_R^i

$$T = \begin{bmatrix} R & d \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} r_{11} & r_{12} & r_{13} & d_x \\ r_{21} & r_{22} & r_{23} & d_y \\ r_{31} & r_{32} & r_{33} & d_z \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} c_\theta c_\psi & -c_\theta s_\psi & s_\theta & d_x \\ c_\phi s_\psi + s_\phi s_\theta c_\psi & c_\phi c_\psi - s_\phi s_\theta s_\psi & -s_\phi c_\theta & d_y \\ s_\phi s_\psi - c_\phi s_\theta c_\psi & s_\phi c_\psi + c_\phi s_\theta s_\psi & c_\phi c_\theta & d_z \\ 0 & 0 & 0 & 1 \end{bmatrix}$$



$$p^R = \begin{bmatrix} p^R \\ 1 \end{bmatrix}$$

$$p^i = T_R^i p^R$$

$$p^i = T_R^i T_{TOF}^R p^{TOF}$$

$$p^i =$$

$$\begin{bmatrix} ? & ? & ? & ? \\ ? & ? & ? & ? \\ ? & ? & ? & ? \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

$$\begin{bmatrix} 1 & 0 & 0 & 0.07 \\ 0 & 1 & 0 & -0.015 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} d_m \\ 0 \\ 0 \\ 1 \end{bmatrix}$$