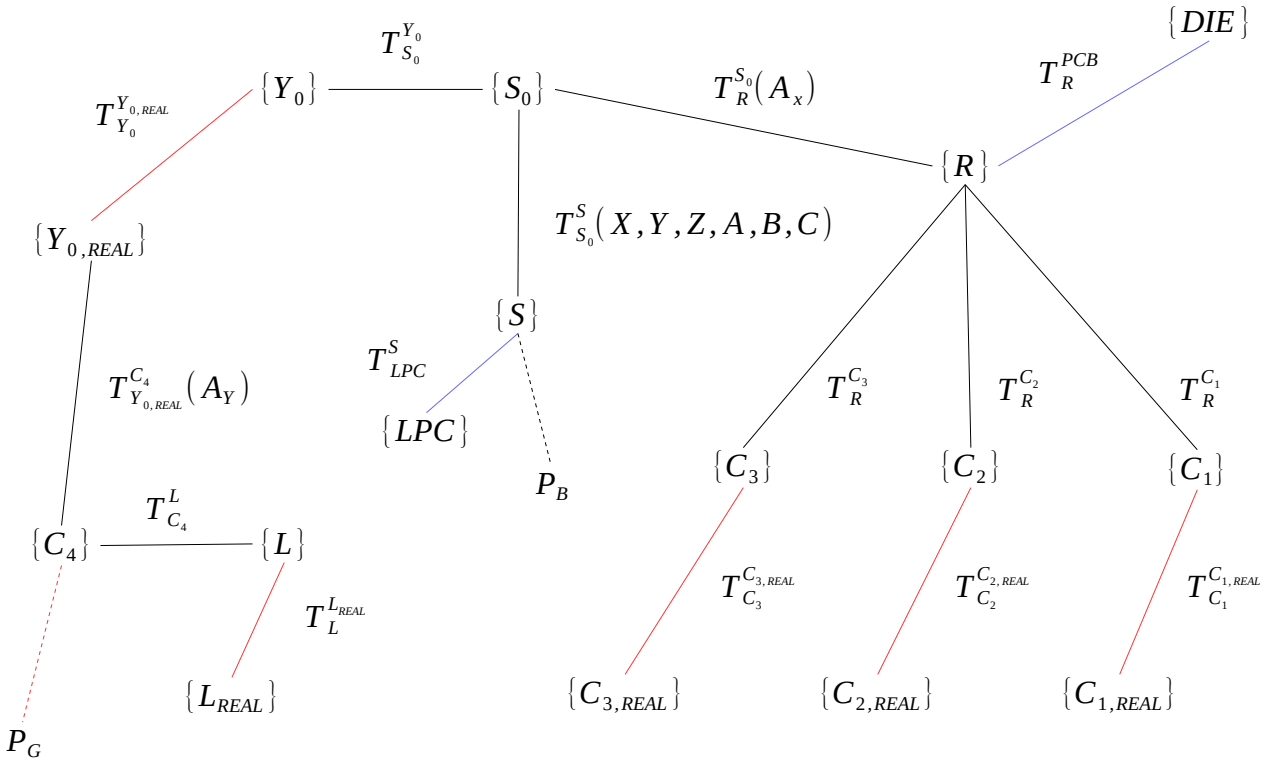
$NOTATION: T^{i}_{j} represents from Frame - j to Frame - i$



Side/Bottom/Rear Calibration Chain

$$P_{C_i} = T^{C_i}_{C_{i,REAL}} T^{R}_{C_i} T^{S_0}_{R}(A_X) T^{S}_{S_0}(X,Y,Z,A,B,C) P_B$$

Top Calibration Chain

$$P_{C_4} = T^{Y_{0,REAL}}_{C_4}(A_Y) T^{Y_0}_{Y_{0,REAL}} T^{S_0}_{Y_0} T^{R}_{S_0}(A_X) P_R$$

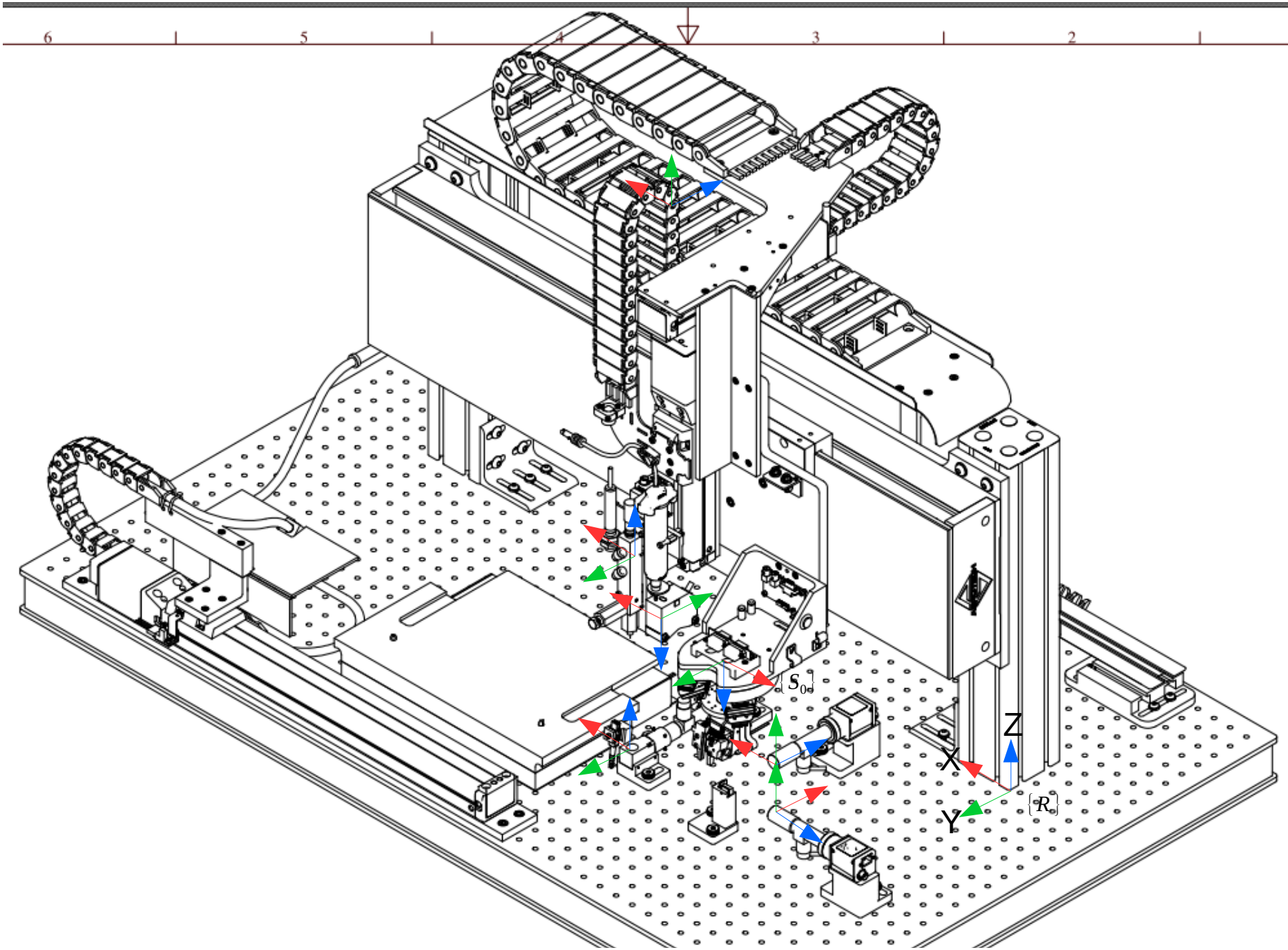
$$P_R = T^{C_3}_{R} T^{C_{3,REAL}}_{C_3} P_{C_{3,REAL}}$$

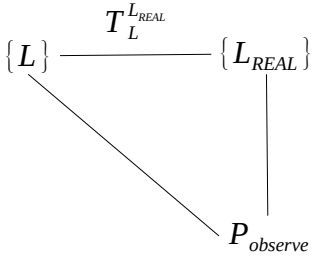
Distance Meter Calibration Chain

$$P_{L_{REAL}} = T^{L}_{L_{REAL}} T^{C_4}_{L} T^{Y_{0,REAL}}_{C_4}(A_Y) T^{Y_0}_{Y_{0,REAL}} T^{S_0}_{Y_0} T^{R}_{S_0}(A_X) P_R$$

$$P_R = T^{S_0}_{R} T^{Y_0}_{S_0} T^{Y_{0,REAL}}_{Y_0} T^{C_4}_{Y_{0,REAL}}(A_Y) P_{C_4}$$

$$V_R = T^{S_0}_{R}(A_{X,1}) T^{Y_0}_{S_0} T^{Y_{0,REAL}}_{Y_0} T^{C_4}_{Y_{0,REAL}}(A_{Y,1}) T^{L}_{C_4} T^{L_{REAL}}_{L} P_{L_{REAL,1}} - T^{S_0}_{R}(A_{X,2}) T^{Y_0}_{S_0} T^{Y_{0,REAL}}_{Y_0} T^{C_4}_{Y_{0,REAL}}(A_{Y,2}) T^{L}_{C_4} T^{L_{REAL}}_{L} P_{L_{REAL,2}}$$


6
5
4
3
2
S_0
Z
X
Y
R_0



$$P_{observer_l} = \begin{bmatrix} C_x \\ C_y \\ C_z \\ 1 \end{bmatrix} = T_L^{L_{REAL}} P_{observer_{lreal}} = \begin{bmatrix} 1 & -e_z & e_y & s_x \\ e_z & 1 & -e_x & s_y \\ -e_y & e_x & 1 & s_z \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 0 \\ 0 \\ M_z \\ 1 \end{bmatrix}$$

$$P_r = \begin{bmatrix} Ax + Ay\,C_1 + C_2\,Mz + C_3 \\ Ay + C_4\,Mz + C_5 \\ Ay\,C_9 + C_6\,Mz + C_7 \end{bmatrix}$$

$$r^2 = (Ay + C_4\,Mz + C_5)^2 + (Ay\,C_9 + C_6\,Mz + C_7)^2 + (Ax + AyC_1 + C_2\,Mz + C_3)^2$$

¿

$$= \begin{bmatrix} A_x & A_y & Mz \end{bmatrix} \begin{bmatrix} 1 & C_1 & C_2 \\ C_1 & C_1^2 + C_3^2 + 1 & C_1C_2 + C_3C_6 + C_4 \\ C_2 & C_1C_2 + C_3C_6 + C_4 & C_2^2 + C_4^2 + C_6^2 \end{bmatrix} \begin{bmatrix} A_x \\ A_y \\ Mz \end{bmatrix}$$