Step 1

1) laser Point $= \begin{pmatrix} u \\ v \\ 1 \end{pmatrix}$ < 2 points from left, 1 point from right

2) $\underset{(3\times1)}{P_w} = s \cdot \underbrace{\underset{(3\times3)}{R^{-1} \cdot A^{-1}} \begin{pmatrix} u \\ v \\ 1 \end{pmatrix}}_{\vec{b}\ (3\times1)} - \underbrace{\underset{3\times1}{R^{-1} T}}_{\vec{a}}$

where $\vec{a} = \begin{pmatrix} a_x \\ a_y \\ a_z \end{pmatrix}$ and $\vec{b} = \begin{pmatrix} b_x \\ b_y \\ b_z \end{pmatrix}$

so $s(\text{scalar}) = a_z / b_z$

Step 2 : Transform right laser point in left coordinate system

$$\underset{3\times1}{P_c} = \underset{3\times1}{R_1^{-1} \cdot P_K} - \underset{3\times1}{R_1^{-1} T_1}$$

where $P_k = \underset{3\times4}{[R_2 | T_2]} \cdot \underset{4\times1}{P_w}$

Step 3 : Find Laser Plane Equation from 3 points

$$Ax + By + Cz + D = 0$$

where $\vec{N} = \begin{pmatrix} A \\ B \\ C \end{pmatrix}$

Step 4 : find 3D object point ← object point

1) $P_w = s \cdot R^{-1} A^{-1} \begin{pmatrix} u \\ v \\ 1 \end{pmatrix} - R^{-1} T$

where

$$s = \frac{\vec{N} \cdot \vec{a} - D}{\vec{b} \cdot \vec{N}}$$