Observation Matrix W

$$\tilde{u}_{f,p} = \mathbf{i}_f^T P_p$$
$$\tilde{v}_{f,p} = \mathbf{j}_f^T P_p$$

$$\begin{bmatrix} \tilde{u}_{f,p} \\ \tilde{v}_{f,p} \end{bmatrix} = \begin{bmatrix} \mathbf{i}_f^T \\ \mathbf{j}_f^T \end{bmatrix} P_p$$

$$\begin{array}{l} \\ \text{Image 1} \\ \text{Image 2} \\ \\ \text{Image F} \\ \hline \text{Image 1} \\ \text{Image 2} \\ \\ \text{Image F} \end{array} \begin{array}{c} \begin{array}{cccc} \text{Point 1} & \text{Point 2} & & \text{Point N} \end{array} \\ \begin{bmatrix} \tilde{u}_{1,1} & \tilde{u}_{1,2} & \cdots & \tilde{u}_{1,N} \\ \tilde{u}_{2,1} & \tilde{u}_{2,2} & \cdots & \tilde{u}_{2,N} \\ \vdots & \vdots & \vdots & \vdots \\ \tilde{u}_{F,1} & \tilde{u}_{F,2} & \cdots & \tilde{u}_{F,N} \\ \hline \tilde{v}_{1,1} & \tilde{v}_{1,2} & \cdots & \tilde{v}_{1,N} \\ \tilde{v}_{2,1} & \tilde{v}_{2,2} & \cdots & \tilde{v}_{2,N} \\ \vdots & \vdots & \vdots & \vdots \\ \tilde{v}_{F,1} & \tilde{v}_{F,2} & \cdots & \tilde{v}_{F,N} \end{bmatrix} \end{array} = \begin{bmatrix} \mathbf{i}_1^T \\ \mathbf{i}_2^T \\ \vdots \\ \mathbf{i}_F^T \\ \hline \mathbf{j}_1^T \\ \mathbf{j}_2^T \\ \vdots \\ \mathbf{j}_F^T \end{bmatrix} \begin{array}{c} \begin{array}{cccc} \text{Point 1} & \text{Point 2} & & \text{Point N} \end{array} \\ \begin{bmatrix} P_1 & P_2 & \cdots & P_N \end{bmatrix} \end{array}$$

$W_{2F\times N}$

Centroid-Subtracted Feature Points (Known)

$M_{2F\times 3}$

Camera Motion (Unknown)

$S_{3\times N}$

Scene Structure (Unknown)