If $X = \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_m \end{bmatrix}$ random vector with m elements,

the mean value of N samples of the vector
is calculated as:

$$\bar{X} = \frac{1}{N} \sum_{i=1}^{N} X_i$$

and the covariance matrix is:

$$\sum_x = \frac{1}{N-1} \sum_{i=1}^{N} (X_i - \bar{X}) \cdot (X_i - \bar{X})^T$$