

# **Coregistration of Pose Measurement Devices Using Nonlinear Least Squares Parameter Estimation**

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## **Abstract**

Multimodal visual haptic user interfaces can be made more effective by accurately colocalizing the workspaces of their components. We have developed a coregistration technique for pose measurement devices based on nonlinear least squares parameter estimation. A reduced quaternion parameterization is used for representing the orientation component of coordinate transformations, which avoids the numerical instability of traditional approaches. The method is illustrated with two examples: the colocalization of a haptic device with a position tracker, and the coregistration of an optical and a magnetic tracking system.