

From meso-scale to metre-scale machines – developments in position measurement technologies

Jonathan Abir and James Norman, PhD Researchers

*EPSRC Centre for Innovative Manufacturing in Ultra Precision
Cranfield University*

Abstract

There are two primary functions for a machine frame: to transfer forces and provide a position reference. Machine tools and measurement systems alike require precision positioning capability to enable accurate production of components and low uncertainty measurement for verification of such components. There are two types of frame distortions that affect position measurement and control: processing and servo forces, and thermal forces.

Traditionally, a separate metrology frame for position measurement can be utilised to decouple the measurement system from the 'stressed' force frame. Metrology frames can be found in lithography systems and high precision co-ordinate measurement machines. This technique is limited by the mass and size of the material required to construct the metrology frame and the ability to scale up/down for use on metre-scale or meso-scale systems.

'Virtual' metrology frame techniques have been developed to overcome some of these limitations. This presentation will discuss the use of virtual metrology frames in metre- and meso-scale machines.

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