

THE RIGHT TEMPERATURE FOR COLLABORATION



In precision systems, thermal effects have a large influence on the desired accuracy and throughput. In machine tools, heat generated by driving motors and processes leads to deformations that reduce accuracy. In semiconductor lithography tools, extreme thermal conditioning and control is needed to achieve nanometer overlay precision. In tools for nanoscience, thermal drift on a nanometer scale can limit an application. For instance, in the latest generation of transmission electron microscopes, sub-Ångström imaging resolution can only be achieved with corresponding small drift rates. Such microscopes are at the vanguard of developments in structural biology.

In 2007, as Chief Executive of euspen (European Society for Precision Engineering & Nanotechnology), I received a request from the then CTO of Philips Centre for Industrial Technology (CFT), Prof. Jan van Eijk, to initiate a Special Interest Group on 'Thermal Effects in Precision Systems'. We held a first meeting, in Maastricht, which was attended by over 100 delegates from 20 countries and brought to the table challenges and developments from applications ranging from machine tools, space optics and synchrotrons to lithography systems and printers. Subsequent meetings continued to reinforce the importance of the topic and breadth of the impact. In simple terms, standard methodologies, such as are applied for the mechanics, positioning and control, are an outstanding need for thermal problems.

Jump forward to 2012 and, coming from the UK, I am newly living in Eindhoven. Thermal issues have been highlighted by the local precision engineering community as a common problem. With no government funding on the horizon, Hans Vermeulen of ASML and Henny Spaan of IBS wondered if it would be possible to put together an industrial consortium to fund work on this area. I volunteered to see if we could find interested parties and together shape both a program of work and a structure for collaboration. In my search, I could also practice driving on the 'other side' of the road. In the event, together with our potential partners, we covered many miles – many cups of coffee were drunk, IP issues and collaborative structures discussed. Thanks to all their efforts, a consortium agreement was signed in September 2015.

For the first time these partners (ASML, IBS Precision Engineering, FEI Electron Optics, Philips Electronics Nederland, VDL Enabling Technologies and Segula Technologies Nederland) had come together to conduct shared development in a new innovation forum.

The Advanced Thermal Control Consortium has been brought together to cover the common needs of the Dutch high-tech industry, addressed by leading Dutch research institutes TU Eindhoven and TU Delft. It will deliver a step change for products within multiple markets, including life sciences & health, semicon and automotive. And it is open to new industrial members – Interested? *De koffie is bruin* (coffee's ready).

Dr Theresa Spaan-Burke
Innovation Director, IBS Precision Engineering
burke@ibspe.com