## European Metrology Research Programme

### Industrial Innovation

An overview of the funded projects from the EMRP Call 2010 – Industry

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<tr>
<th>Measuring optical curved surfaces</th>
<th>Advanced assessment of engineered surfaces</th>
<th>Understanding industrial vacuums</th>
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<td>Optical and tactile metrology for absolute form characterisation (IND10)</td>
<td>Metrology to assess the durability and function of engineered surfaces (IND11)</td>
<td>Vacuum metrology for production environments (IND12)</td>
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<td><strong>Characterising free-form 3D surfaces</strong> Measurements of 3D forms are important for characterising surfaces in the optics and precision engineering industries, as well as in astronomy and science. This project will create standards and will perform measurement comparisons to validate the two most commonly used 3D measurement types – imaging methods and single-point scanning.</td>
<td><strong>Reducing wear and friction in components</strong> Advances in surface engineering have helped to reduce losses caused by friction and wear of components. This project will develop macroscale to nanoscale measurements, for assessing engineered surfaces. This should increase component lifetime, reduce equipment downtime and improve industrial efficiency and sustainability.</td>
<td><strong>Improving vacuum measurements for better end-products</strong> Vacuum has long been an important tool in industry and is still used today in modern lighting, the semiconductor industry and fusion power research. However, vacuum is poorly understood when used outside of the laboratory. Therefore, this project aims to improve vacuum measurements in conditions representative of those in industry.</td>
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<td><strong>Measurement consistency with time and temperature</strong> Material properties change with temperature and over time, reducing the reliability and performance of measurement devices. This project will use thermal modelling of a prototype measurement device to improve temperature control and thermal design and increase our understanding of measurement drift.</td>
<td><strong>Accurate atomic clocks for industry</strong> This project will develop new standards to improve the stability of the high frequency atomic clocks used to provide satellite navigation systems and fast internet access. This should result in clocks becoming more stable, robust and portable, improve synchronisation between them, and enable higher speed data transfer.</td>
<td><strong>Supporting the miniaturisation of technological components</strong> This project will provide a reference standard to add traceability to scatterometric measurements and make them comparable to microscopic methods. This is important for the optical and semiconductor industries as they depend on component miniaturisation and reliable measurements of small structures.</td>
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### Measuring optical curved surfaces

Optical and tactile metrology for absolute form characterisation (IND10)

### Advanced assessment of engineered surfaces

Metrology to assess the durability and function of engineered surfaces (IND11)

### Understanding industrial vacuums

Vacuum metrology for production environments (IND12)

### Stable and reliable measurement systems

Thermal design and time-dependent dimensional drift behaviour of sensors, materials and structures (IND13)

### Improving the accuracy of atomic clocks

New generation of frequency standards for industry (IND14)

### Understanding chemical interactions at surfaces

Traceable quantitative surface chemical analysis for industrial applications (IND15)

### Increasing frequencies for communications technologies

Metrology for ultrafast electronics and high-speed communications (IND16)

### Underpinning small structure measurement

Metrology of small structures for the manufacturing of electronic and optical devices (IND17)