A Fresh Look at Optical Interferometry

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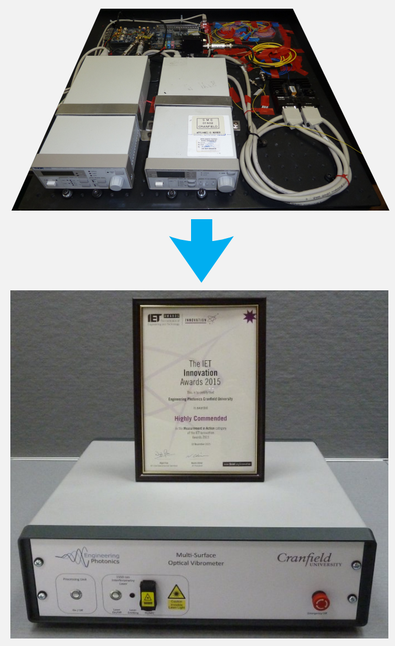
Engineering Photonics

From fundamental research into optical measurement techniques to applied research projects



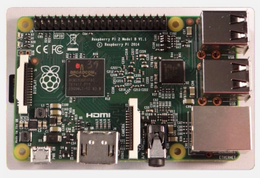
- New measurement technique developed during blue-sky PhD project
- Already forms a vital part in two large-scale research programmes
- Inherent simplicity of the technique lends itself to further miniaturisation and cost-savings, widening its application base

Features of the technique

- Distance measurements over cm ranges at nanometre resolution and data rates of many kHz
- Permits measurements in air or within optical fibres
- Novel range-resolved approach allows multiple surfaces/ multiple sensors to be interrogated simultaneously
- Simple, cost-effective and flexible setup

Outreach

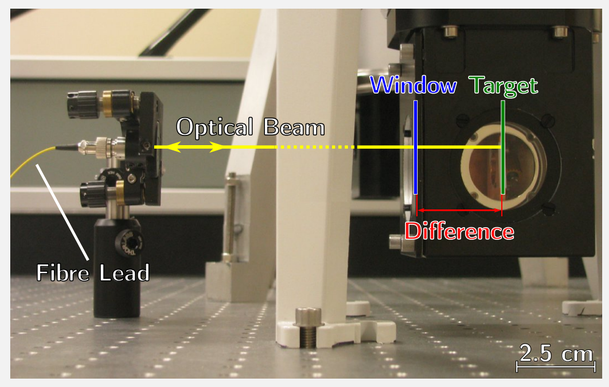
Open-source project to allow nanometre precision distance measurements underway

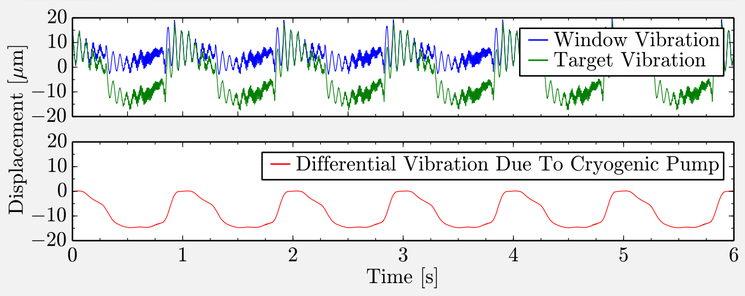


- Based on a low-cost laser and Raspberry PI computer
- Aims to push price tag below £1000, to make project accessible to schools, researchers and enthusiasts

Example application

Characterisation of a new generation of Oxford Instruments cryostats

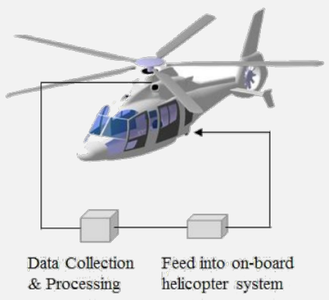


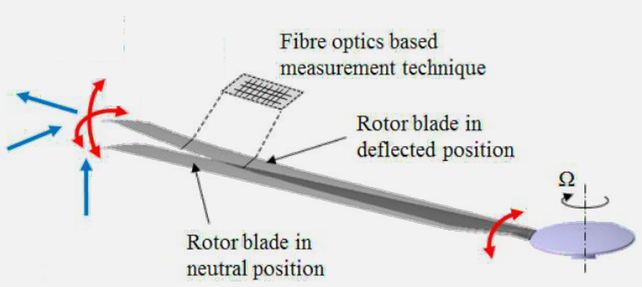


Makes use of unique capability for simultaneous, multi-surface single-beam vibration measurements

Current research programmes

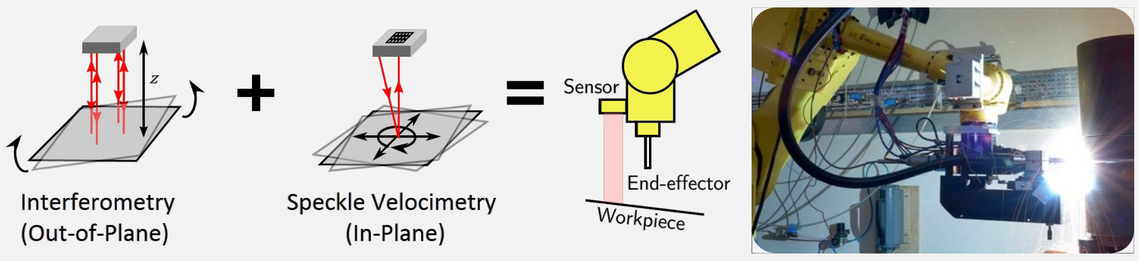
BladeSense - Helicopter blade deformation measurements using fibre optic shape sensing





A 3-year ATI/Innovate UK and Airbus Helicopters UK funded project aimed at monitoring dynamic performance of helicopter blades

wPOS - Measuring position and orientation of the robot arm relative to the workpiece



A 3-year EPSRC funded project aimed at developing sensors to improve flexibility and precision in laser-based processing and robotic manufacturing

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Acknowledgements

EPSRC Engineering and Physical Sciences Research Council
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