



Код: 10909

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Remotely Deployable Autonomous Surface Inspection and Characterisation Using Active Whisker Sensors

Дрезден, Германия, 2012 год

8 стр; формат: 23,5 x 16 см; библиографический список: 16 единиц

For structural monitoring applications, the use of remotely deployable Non Destructive Evaluation (NDE) inspection platforms, offer many advantages when compared to traditional techniques in respect of accessibility, safety and financial outlay. The use of such platforms, previously reported by researchers at Strathclyde University, allows rapid inspection of large areas and volumes, ensuring structures are safe and operable to modern requirements.

Researchers at Bristol Robotics Laboratory have developed a biomimetic tactile sensing system modelled on the facial whiskers (vibrissae) of animals such as rats and mice. Such sensors are attempting to recreate the process in which animals detect proximity to nearby objects, along with their shape and texture. A critical feature of such a sensor is in the whisking motion, in a back and forth manner in which the end tapered tips sweep the surface.

The current work reports on our preliminary collaborative work to integrate the active whisker sensor into a robotic NDE system. A novel approach to surface roughness scanning is presented, highlighting the benefits and sensory information received from such an active sensing system. Additionally a representative test sample was characterised against conventional standard surface roughness measurement techniques.

Доклад. 6-я Европейская конференция по мониторингу технического состояния сооружений, 2012. Редакция Кристиана Боллера.

Ключевые слова:

Содержание

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Vibrissae based sensing systems
Artificial whisker module
Surface roughness measurements
Vibrissae inspired NDE applications
Vibrissae based surface roughness characterisation
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