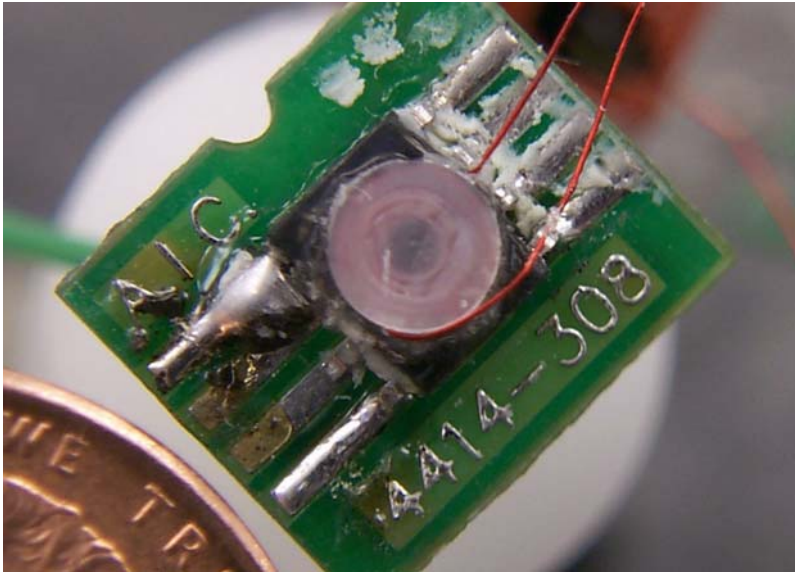


Center for Precision Metrology (CPM)

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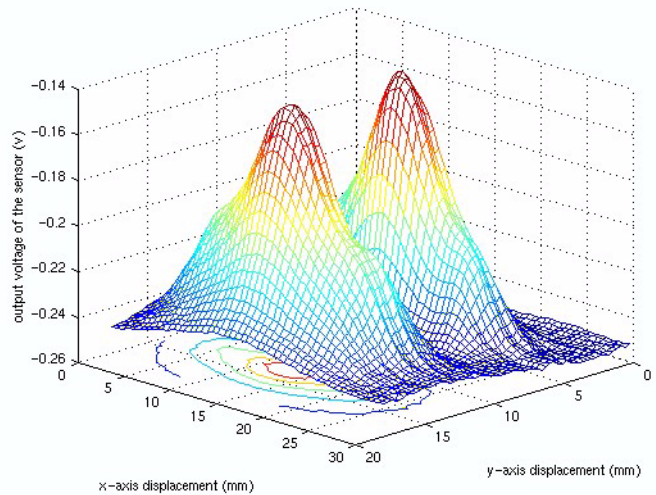
Giant Magneto-Resistive Eddy Current Sensor



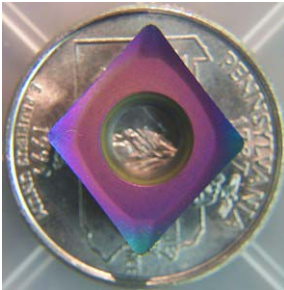
These miniature sensors utilize the Giant Magneto-Resistive (GMR) property that has been demonstrated in some materials. The GMR property is present when an external magnetic field significantly alters the resistance of a conductor. The device produces a magnetic field and then measures it using a GMR device. When the sensor is scanned near a material, the structure of that material influences the magnetic field. If there is the presence of a micro-crack (surface or subsurface) in the nearby material, eddy currents are generated which are clearly discernible to the sensor.

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By enabling the detection of subsurface cracks, catastrophic failure of materials can be predicted which was hitherto impossible. The device has applications in aerospace where cracks near bolted joints are a problem and also in rail systems where defective tracks can be replaced before there is a problem. The project resulted in U.S. Patent 6,504,363 and was the lead technology for a spin-off company. For more information, contact Robert Hocken, 704-547-4863; e-mail: hocken@uncc.edu.



Diamond Thin Films



The development of techniques for depositing thin diamond films on surfaces was advanced for the purpose of producing wear-resistant machine tooling. Diamond has two useful properties. It is hard and it is an excellent thermal conductor. The results of coating tools with diamond are greater wear resistance and the removal of heat from the tool/workpiece interface. The latter may increase the material removal rate for materials such as titanium which have traditionally been machined at very slow rates to prevent flash combustion and material softening due to near melting temperatures. Additionally less coolant may be required resulting in a more environmentally friendly process. The processing techniques provided the basis for the development of technologies for a pending patent. For more information, contact Robert Hocken, 704-547-4863; e-mail: hocken@uncc.edu.

Standards for Tight-Tolerance Manufacturing Machines

Several projects were directed toward developing performance evaluation standards for coordinate measuring machines (CMMs). These are machines critical for verification of tight-toleranced manufacturing in the U.S. Along with the development of the standards. A device for performance evaluation of these machines was patented (U.S. 6,434,845) and licensed to a major U.S. supplier of metrology equipment. The device is capable of measuring probing forces, which may be sufficient to damage a component that is to be measured. Additionally, it is capable of assessing the ability of CMM's to scan parts for reverse engineering purposes. For more information, contact Robert Hocken, 704-547-4863; e-mail: hocken@uncc.edu.

