

## ***Philtec Sensors Contribute To The Success of the 2003 NASA/JPL Mars Rover Mission***

### **Background**

NASA's Jet Propulsion Lab in conjunction with Cybersonics, Inc. of Erie, PA, USA, developed the Ultrasonic/Sonic Driller/Corer (USDC) to drill core samples of rocks on Mars.



The sonic drill requires no sharpening, has no drill chatter and can be safely guided by hand. It has only two moving parts and no gears or motors. Piezoelectric materials change shape under the application of an electrical field, providing the necessary actuation capability. It was chosen by R&D Magazine as one of the top 100 products of the year 2000.



### **Ultrasonic Piezoelectric Transducer Tests**

Cybersonics modeled and developed the piezoelectric transducer for the USDC. They have reported experimental measurements

made with a Philtec optical sensor which was used to characterize the harmonic analysis and axial motion of the sonic drill.\* Philtec's model RC25-HQ sensor with 200 KHz bandwidth was selected because it can detect high frequency low amplitude motions. They reported excellent agreement with physical test measurements and model predictions.

\* [www.ohiocae.com/piezo-paper.htm](http://www.ohiocae.com/piezo-paper.htm)

### **JPL USDC Homepage**

For additional information regarding the JPL Sonic Driller, please go to their web site:

<http://ndeaa.jpl.nasa.gov/nasa-nde/usdc/usdc.htm>

This website describes the JPL's NDEAA ultrasonic drilling activity.

### **Medical Application**

Cybersonics has continued product development after the Rover mission. Their latest product offering is called the Cyberwand Lithotripter. The Cyberwand is a device that is used to destroy kidney stones. The manufacturer claims that it is the most efficient available lithotrite.