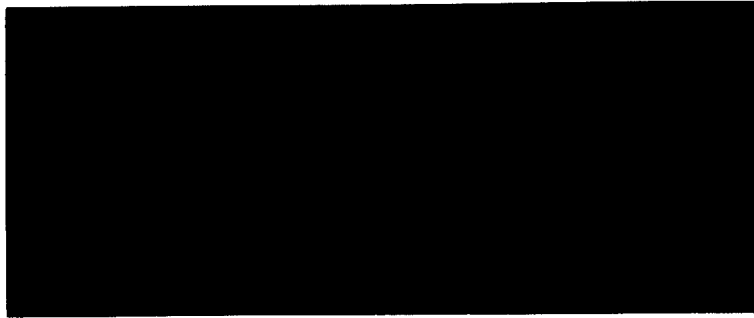


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*The
University of Mississippi*

**ENHANCED EQUIPMENT FOR ACOUSTIC
DETECTION OF BURIED LANDMINES**

PERFORMANCE/TECHNICAL REPORT

GRANT NUMBER: N00014-01-1-0458

SUBMITTED TO:

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ABSTRACT

Using funds provided by the Office of Naval Research, the University of Mississippi purchased three new laser Doppler vibrometers (LDVs) and upgraded an existing LDV for use in acoustic landmine detection research.

RESULTS AND DISCUSSION

The Office of Naval Research awarded Grant N00014-01-1-0458 to the University of Mississippi to purchase optical sensors for research into acoustic-to-seismic (A/S) coupling-based landmine detection. The University of Mississippi currently is developing A/S mine detection technologies under contract with the US Army Communications-Electronics Command Night Vision and Electronic Sensors Directorate.

A/S landmine detection uses a sound source to excite vibration in the ground. The acoustic energy propagates downward into the porous soil. If a landmine is present, this energy causes the acoustically compliant surface of the mine to resonate. This resonance causes the surface of the ground above the buried mine to vibrate with greater amplitude than the surrounding region. The area of increased vibration assumes the size and shape of the buried landmine. This vibrational pattern is measured with an optical sensor known as a laser Doppler vibrometer (LDV).

The University of Mississippi used the funds from this grant to purchase three LDVs and to upgrade an existing LDV. The purchased LDVs were all manufactured by Polytec PI and included a PSV 300 scanning LDV and two PDV 100 single point digital LDVs. A PSV 200 LDV owned by the University of Mississippi was upgraded to be compatible with the PSV 300 LDV so that they could be used interchangeably in landmine detection tests.

At the present time, all four vibrometers are currently in use for landmine detection testing. The PDV 100 LDVs were also used to assist in cleanup operations in New York following the 11 Sep 01 terrorist attacks. The LDVs were used to monitor vibrations in remaining structures during debris removal to ensure the buildings would not collapse on rescue workers.