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**Fast acoustic landmine detection using multiple beam laser
Doppler vibrometry**

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An acoustic method of buried landmine detection consisting of excitation of the ground using airborne sound or seismic waves in the frequency range from about 50Hz to 1000Hz, and obtaining a velocity image of the ground surface with a laser Doppler vibrometer (LDV) has been developed and successfully tested in the laboratory and field experiments. The presence of a buried landmine can be detected by an abnormality in the velocity image. Initially, the scanning single-beam LDV created a velocity image of the ground through point-by-point measurements, which resulted in a long measurement time. To reduce this measurement time, a multiple beam LDV having 16 beams configured in a linear array was developed and successfully used in field experiments. To further reduce the time of measurement, a full-field LDV capable of making 256 vibration measurements in parallel on the target, configured as 16x16 square array of points equally separated in x- and y-directions has been recently developed. The system is capable of creating a 2-dimensional vibrational velocity image of the ground surface in the time defined by the required frequency resolution. The parallel measurement makes the system a unique tool to measure transient vibrations.