Fact Sheet

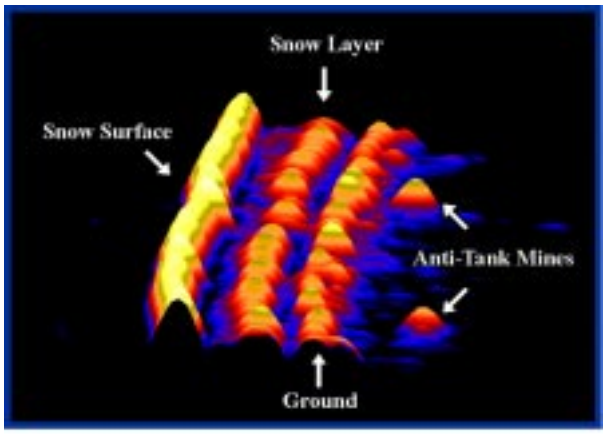
TEST SITE FOR INVESTIGATING ENVIRONMENTAL IMPACT ON RADAR DETECTION OF BURIED LAND MINES

BACKGROUND

The detection of buried land mines is made difficult by their diverse size, shape, and composition. The problem is further complicated by the diverse environmental conditions under which these mines are likely to be encountered. At present, no single technology can reliably tackle this enormously difficult problem. A multiple-sensor approach is required to achieve an acceptable degree of reliability. A key component of a multisensor package for detecting buried land mines is the surface-penetrating radar. A major drawback of a radar system is its sensitivity to changing environmental conditions. The environmental impact on radar detection of buried land mines is currently under investigation.

SOLUTION

An outdoor test site has been constructed to investigate the environmental effect on radar detection of buried land mines. FMCW radars operating at 0.5–4.5 GHz and 2–6 GHz bandwidths are used to obtain radar images of buried land mines. The radars are mounted on a motorized gantry that can scan over a 10-m × 15-m plot where representative anti-tank and anti-personnel mines have been buried. In conjunction with the radar measurements, the state of the ground is continuously monitored with buried thermistor array and soil moisture probes.



A 0.5- to 4.5-GHz FMCW radar mounted on a 10-m gantry, and a radar image of buried anti-tank mines.

FUTURE PLANS

An RF vector network analyzer (30 KHz–6 GHz frequency range) will soon be added to the test site to measure the magnitude and phase characteristics of the radar signals reflected from buried land mines. A radar array system (1.2-m-long array of 64 dual-polarized, modulated scattering probes) is currently under development (SBIR contract DACA33-96-C-0006) to obtain detailed tomographic images of buried land mines. The enhanced radar technology will be used to explore innovative radar measurement and processing techniques to improve the current detection and discrimination capability of buried land mines.

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