Hardware Implementation of Signal Processing Schemes for Through-the-Wall Radar Imaging Systems

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Project Summary

The project will develop a system that will permit reliable detection of humans visually obscured behind walls. The specific technology sought is for detection of stationary animate and inanimate objects whose motions are confined or restricted. This is the case for humans badly injured, trapped inside building rubble, or those of an adversary nature such as snipers.

The focus of this proposal is more on hardware development than algorithmic innovations. The specific objectives for our efforts under the 2008-09 Delaware County Keystone Innovation Grants (DCKIG) are:

(a) Examine field programmable gate arrays (FPGA) hardware implementations of the recently developed spatial filtering technique for removal of the impairing effects of walls on the detection of indoor objects.
(b) Provide analyses of the hardware implementation requirements of the electromagnetic (EM) wall removal techniques, such as sampling, quantization, input/output interface, function mapping, and modularity, and as a function of power and signal bandwidth.
(c) Filing a patent based on the devised hardware-software realization along with the proposed innovation.
(d) Parallel and modular implementations of compatible schemes in dual-polarization mode using the same system platform and relying on the same hardware and software components.
(e) Seek commercialization opportunities in defense industry, Electric Power Companies, Department of Homeland Security, and Police Department Municipalities.