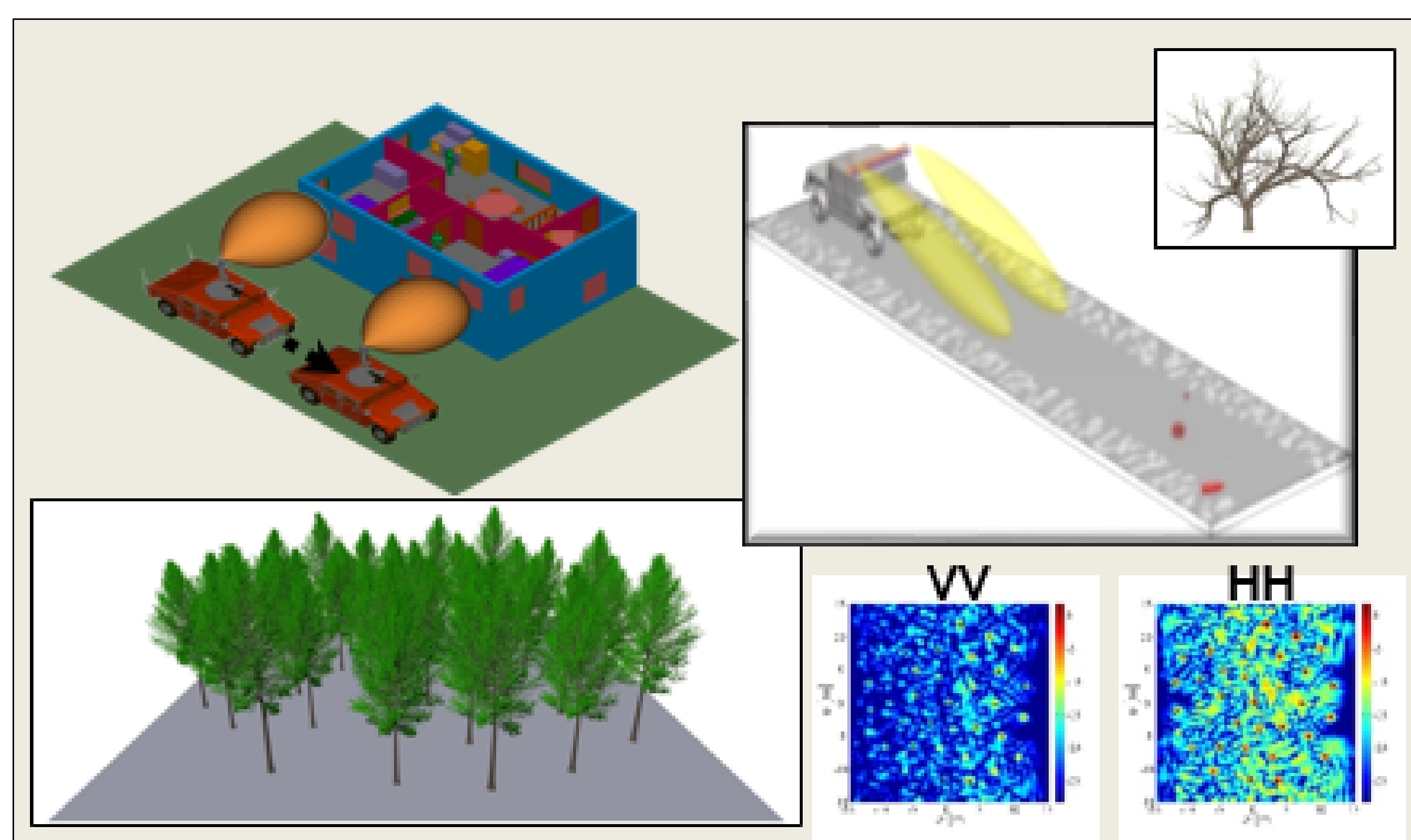


## S&T Campaign: Information Sciences Sensing and Effecting

Anders Sullivan, (301) 394-0838  
anders.j.sullivan.civ@mail.mil

### Research Objective

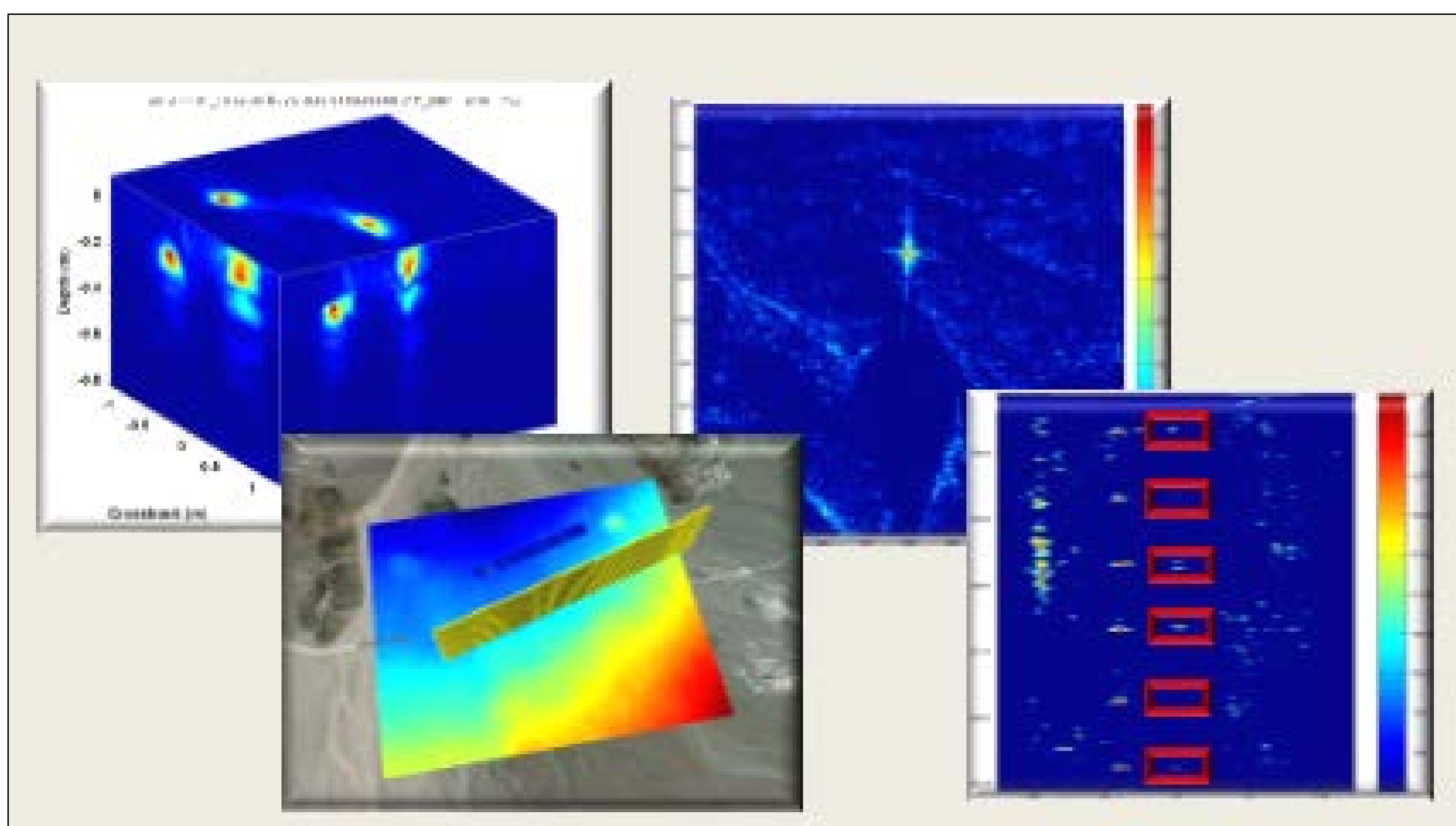
- Conduct research and development of all aspects of radar technology for detecting concealed and low signature radar targets of interest
- Applications include ground penetrating radar (GPR) for landmine and IED detection, ultra-wideband radar (UWB), sense-through-the-wall (STTW) radar, foliage penetrating (FOPEN) radar and cognitive radar



Target and Clutter Models for STTW, FOPEN and GPR Applications

### Challenges

- Developing high-fidelity radar signature modeling of targets embedded in realistic clutter backgrounds
- Developing advanced signal processing algorithms for synthetic aperture radar (SAR)
- Development of RF interference (RFI) mitigation techniques and strategies
- Development of cognitive radar techniques and approaches for the congested RF environment

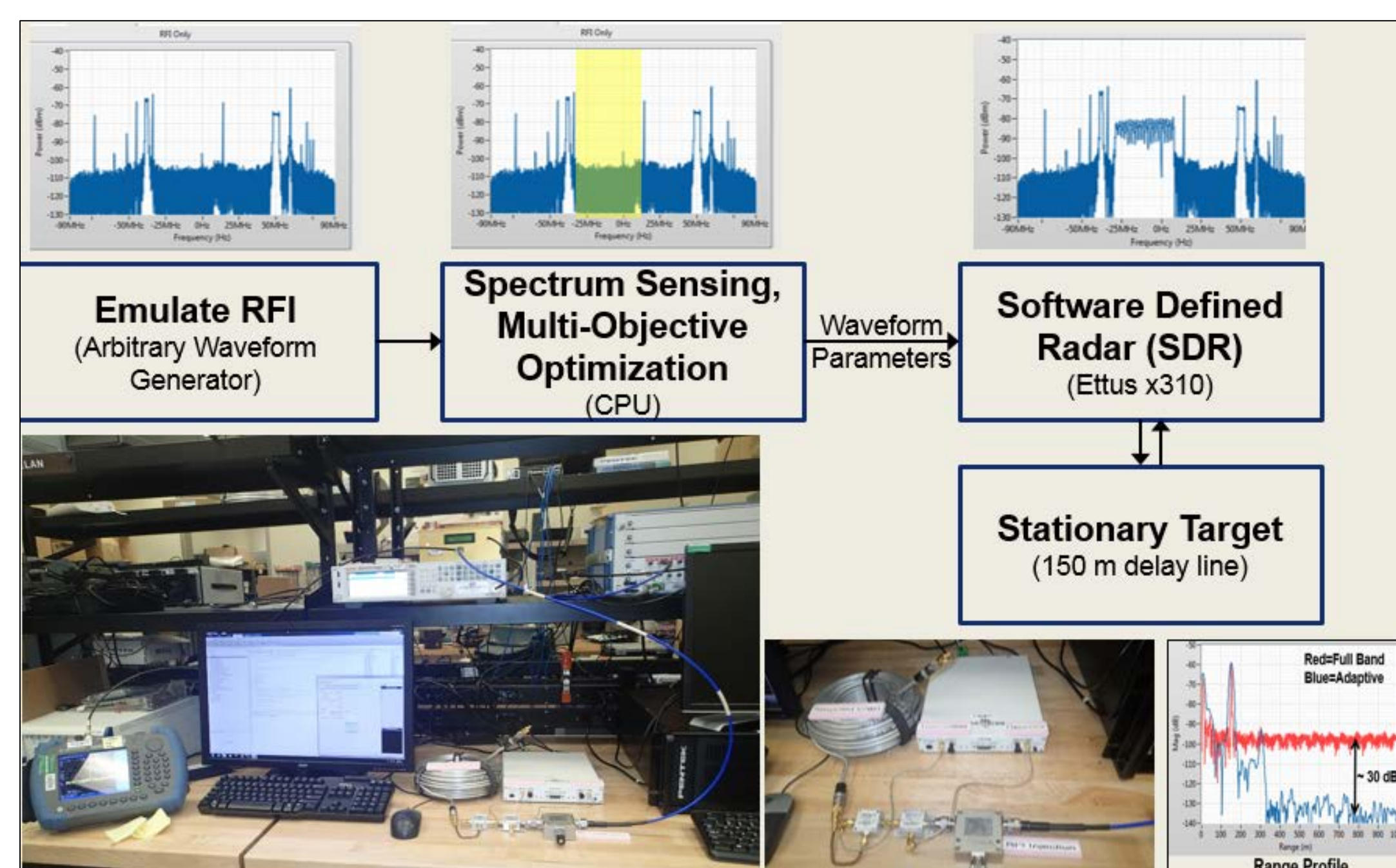


3D Radar Imaging, SAR Processing and Target Detection

### ARL Facilities and Capabilities Available to Support Collaborative Research



Forward Looking UWB Radar Testbed (left); 2D Scanner Sandbox (right)



Cognitive Radar Laboratory Testbed

- Radar laboratory with network analyzers, scopes, signal generators, software defined radios, etc.
- Vehicle mounted ultra-wideband (UWB) radar testbed
- Indoor x-y 2D scanner and sandbox for GPR measurements of buried objects (e.g. landmines, IEDs)
- Brian R. Phelan; Marc A. Ressler; Kenneth I. Ranney; Gregory D. Smith; Getachew A. Kirose; Kelly D. Sherbondy; Ram M. Narayanan, "Performance analysis of spectrally versatile forward-looking ground-penetrating radar for detection of concealed targets," Proc. SPIE. 9461, Radar Sensor Technology XIX; and Active and Passive Signatures VI, 94610J. (May 21, 2015)

### Complementary Expertise/ Facilities/ Capabilities Sought in Collaboration

- Collaborations sought in the following areas: advanced electromagnetic modeling, waveform design, RFI mitigation, all aspects of cognitive radar (hardware and software), advanced processing to enable real time signal processing, advanced radar architectures and design for highly sensitive low noise transceivers, UWB antenna concepts, radar concepts for UAV platforms