Real Time RF Propagation

Research Objective
• Development of validated physical layer models for real time RF propagation in environments of interest
  • Pico-cell to brigade areas of operation
  • New predictive capabilities for cognitive radios, intelligent jamming, waveform development

Challenges
• High fidelity RF propagation calculations for multiple use cases.
  • From pico-cell single building interiors to large areas of operation covering 1000's of square km
  • Simulation of high data rate waveforms
  • Virtualization (packets/second, real time OS, etc.)

Complementary Expertise/ Facilities/ Capabilities Sought in Collaboration
• ARL has developed a number of RF propagation algorithms for GPUs and parallel computing systems such as Longley-Rice and Ray-Tracing
• ARL has a number of HPC systems available for development efforts and collaboration
• ARL is looking to collaborate on the development of full wave EM propagation algorithms for hybrid architectures
• ARL has extensive expertise in hi-fidelity mobile ad-hoc network simulation of traditional waveforms
  • We would like to begin developing advanced models for EW (Electronic Warfare) such as intelligent jammers, Software Defined Radios/GNU radio, etc.
• ARL has expertise in computing MOPs (Measures of Performance) for understanding network performance such as latency, jitter, throughput
  • We would like to develop new MOEs (Measures of Effectiveness), e.g. PESQ or POLQA for VoIP

ARL Facilities and Capabilities Available to Support Collaborative Research
• ARL maintains a hybrid GPU/CPU system dedicated to network simulation and emulation
• The system resides in a unique enclave allowing for simulation and code execution in a closed environment

S&T Campaign: Computational Sciences  
Data Intensive Computing

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