

Software Defined Radar

Current state-of-the-art radar systems are pushing the boundaries of capability by exploiting the flexibility of modern digital processing. By directly digitizing as much bandwidth as possible, tasks which were traditionally done by specialized RF hardware are now done in software by reconfigurable FPGAs and DSPs. Taking a page from Software Defined Radio, these new types of radar platforms have been dubbed Software Defined Radar (SDR).

An SDR research platform is currently being developed at the ElectroScience Laboratory that can adaptively switch between different processing modes. By modifying both transmit waveforms and receive signal-processing tasks on the fly, competitive sensor tasking ensures efficient use of sensor resources so as to gain as much pertinent information as possible on targets and their environment. An information-driven active sensor layer based on a game theoretic approach to sensor management is being developed to control the selection of the current radar operating mode.

The SDR research platform will support the study of advanced radar techniques such as interferometry and polarimetry, transmit frequency diversity, and multiple-input multiple-output (MIMO) operation. Target phenomenology and the urban propagation environment for radar are two additional areas of study which will also be explored with this system.

ElectroScience Laboratory

Software Defined Radar Features:

- 500 MHz or greater waveform bandwidth
- RF Frontend tunable from 1-18 GHz
- High-speed Xilinx FPGAs and Texas Instruments 32-bit DSPs for implementing real-time signal processing
- Information-driven active sensing layer based on a game theoretic approach to sensor management implements competitive sensor tasking to control the selection of the current radar operating mode

