A Flexible Simulator for Multistatic Radars

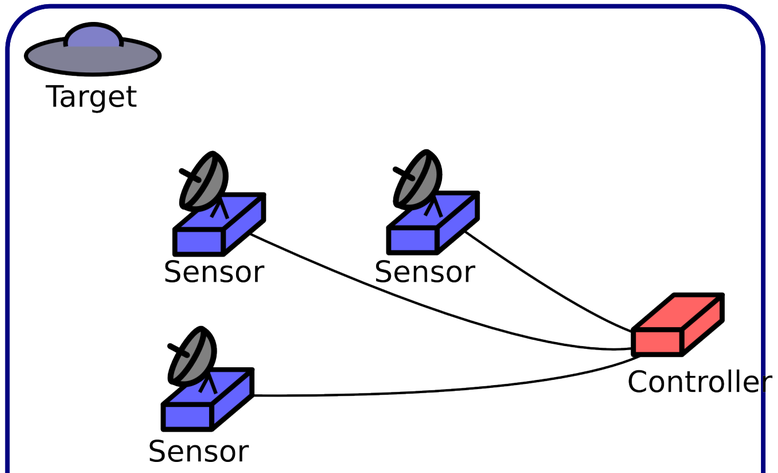
Marc Brooker

Requirements for next-generation radar simulation:

Signal Level Simulation
- Simulate samples from the ADC of the receiver

Flexibility
- Radar and Sonar
- Pulsed and Continuous Wave
- Monostatic, bistatic and multistatic
  - Any number of receivers, transmitters and targets
- Arbitrary waveforms, including wide and narrow band signals
- Active and passive (PCL)
- Electronic warfare (EW), such as jamming

Accuracy
- Accurate simulation of key radar phenomena
  - Amplitude of return signal
  - Phase, time and frequency (Doppler) of return signal
  - Noise, both internal and external to the radar system
  - Phase noise on local oscillators
  - Jitter on ADC and DAC clocks



•Multistatic Radar
- Traditional radar systems have one transmitter and one receiver
  - Sharing the same antenna
  - Known as monostatic radars
- Multistatic radars are more flexible
  - One or more transmitters
  - One or more receivers
- Advantages of multistatic radars
  - Flexible coverage volume
  - Multiple views of target
  - Operation with non-cooperating transmitters
    - e.g. TV and FM transmitters
- Netted radar is an extension of the concept of multistatic radar
- FERS fully supports simulation of multistatic and netted radars

The Implementation: FERS

Portability
- Implemented in portable ISO standard C++
- Runs on Linux, Windows, and others
- Results in standard HDF5 format
  - Easily import into Octave, MATLAB and many others

Extensibility
- Python and C++ extensions can easily be added to the system
- Easily extended XML script format

Freedom
- FERS is free, distribute under the GNU general public licence
- Download FERS from *http://www.sourceforge.net/projects/fers*

Radar Remote Sensing Group, Department of Electrical Engineering, University of Cape Town, Rondebosch, 7701, South Africa
http://www.rrsg.uct.ac.za