

Pre-conference Tutorial 2

Modelling Multifunction Phased Array Radars with MATLAB and Simulink

Abstract:

We will review techniques to model, simulate, and test multifunction phased array radars from the antenna array to data and post-processing algorithms. Using synthesized data, we will describe a range of options to connect to AI and machine learning workflows for target classification, waveform identification, spectrum sensing, and anomaly detection. We will demonstrate efficient ways to generate complex scenarios for algorithm development and validation. We will also show how data collected from radar system hardware compares to models we build during the tutorial.

The outline for the session includes:

- Introduction and motivation for phased array radar system modelling
- Antenna array and RF considerations
- Planning a radar site location based on terrain constraints
- Target modelling including a range of RCS modelling techniques and micro-doppler analysis
- Data processing including efficient multi-object tracking with detection and/or track level fusion
- Radar resource management including multifunction RF (radar, communications, and electronic interference)
- Connecting to radar hardware evaluation boards
- Deployment options with C, HDL, and CUDA

Duration: Half day pre-conference tutorial of 3-4 hours

Author Bio Data



Rick Gentile is the product manager for radar and sensor fusion products at MathWorks. Prior to joining MathWorks, Rick was a Radar Systems Engineer at MITRE and MIT Lincoln Laboratory, where he worked on the development of a range of large radar systems. Rick also was a DSP Applications Engineer at Analog Devices where he led embedded processor and system level architecture definitions for high performance signal processing systems used in aerospace, defense, automotive and industrial applications. Rick is a co-author of the textbook “Embedded Media Processing”. He received a B.S. in Electrical and Computer Engineering from the University of Massachusetts, Amherst and an M.S. in Electrical and Computer Engineering from Northeastern University, where his focus areas of study included Microwave Engineering, Communications and Signal Processing.