

CIELO™ Mockingbird Software: RF Learning Toolbox

MOCKINGBIRD SOFTWARE DEFINED RF TEST SYSTEM

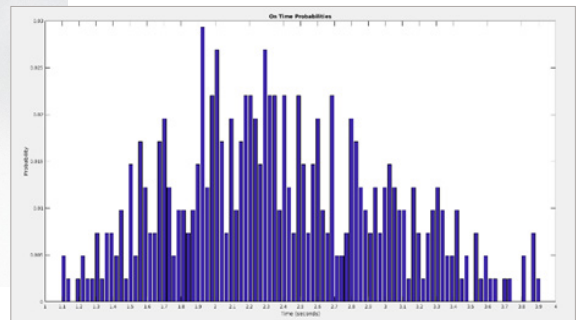
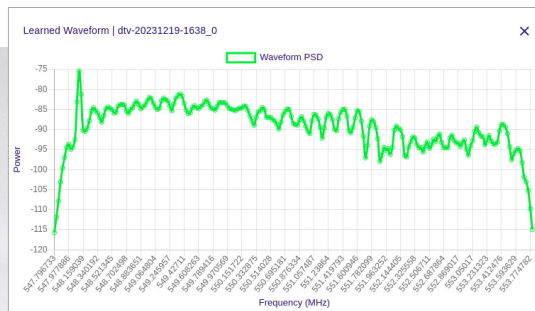
Mockingbird RF Test System is a rugged, software defined RF test system, providing emulated RF scenes, arbitrary RF waveform generation, spectral analysis, and signal capture enabling rapid indoor lab and outdoor field testing with the simplicity and efficiency of a software simulation.

MOCKINGBIRD RF LEARNING TOOLBOX

The Mockingbird RF Learning Toolbox is an optional software toolbox that extends the built-in capabilities of the Mockingbird RF Test System. The RF Learning Toolbox provides the capability to learn the frequency and temporal characteristics of RF signals or the RF environment through direct observation. The resulting learned RF signatures can then be used to create an emulated waveform that has the same PSD shape and temporal characteristics or communications battle rhythm.

The RF Learning Toolbox isolates signals in the observed frequency spectrum and learns the Power Spectral Density (PSD) and probability distributions of the ON and OFF times for each signal. The combination of these three learned results (PSD, ON and OFF time distributions) is called a RF signature.

Each learning session is defined over a specific frequency band and learning time duration. The longer the learning session the more accurate the learned statistics, but we have had very good success for RF learning sessions from on the order of 15 min to 1 hour. The result of the RF learning session is a signal list that includes the RF signature for each signal.



EMULATED RF ENVIRONMENTS

The learned RF signatures can be used to emulate the RF environment or specific RF transmitters. RF signature waveforms transmit a signal that has a PSD and transmission traffic pattern that is statistically similar to the observed RF environment or RF transmitter. The RF signature waveforms can be combined with the other built-in waveform types to create sophisticated RF scenes that captures both naturally occurring RF signals learned from the actual environment along with specific signals of interest (e.g. desired signal, interfering signals, jamming signals) within a dynamic spectral environment.



The complexity of congested and contested environments has led to new innovative RF Machine Learning (ML) approaches to deal with the unpredictability of the dynamic RF environment. These new ML techniques typically require massive data sets to train, validate and test the algorithms to characterize and verify performance prior to operational deployment.

The RF learning toolbox enables the creation of RF scenes that mimic the actual RF environment enabling cost-effective repeatable test scenarios with the same complexity and rich expressiveness of actual operational RF environments, as well as cost-effective generation of the massive RF data sets required to train, validate and test new innovative RF Machine Learning (ML) algorithms.

ABOUT SYNCOPATED

Syncopated is a creative provider of custom products and solutions for cognitive radio and edge analytic acceleration. Our solutions enable you to start further down the development path, reducing time-to-market and allowing you to focus on your innovative solution. Unlike most vendors, customization of our products for your specific needs is embraced not discouraged.

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