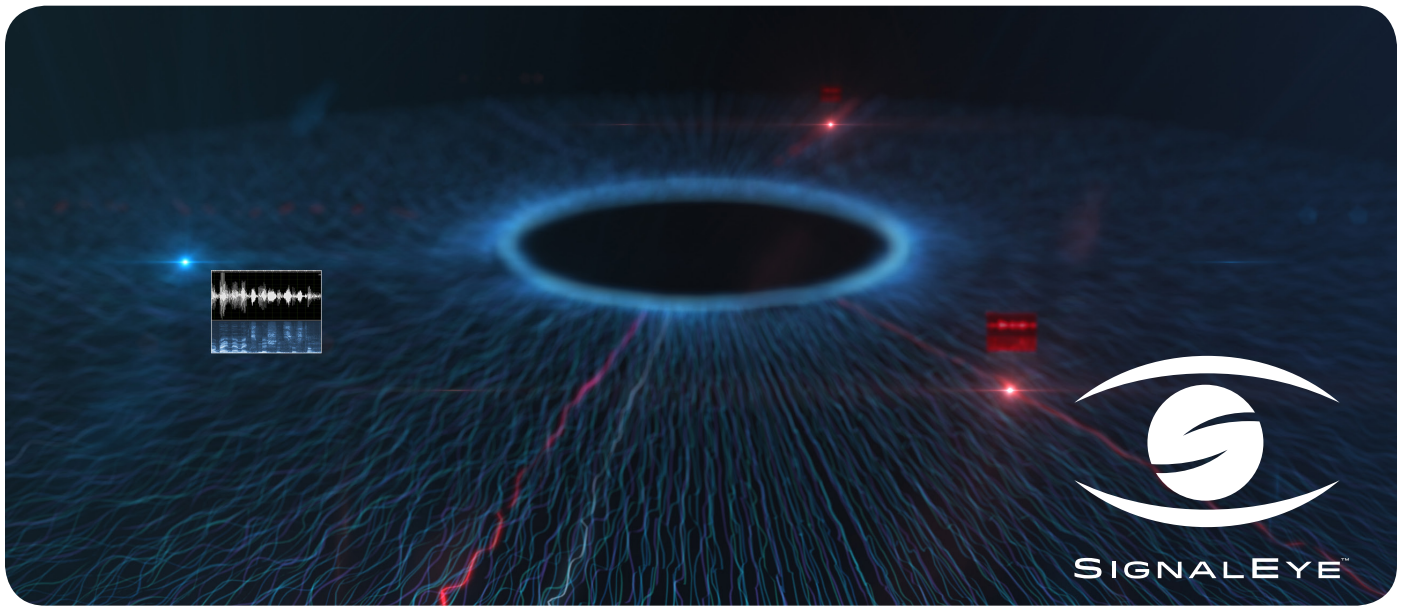
GENERAL DYNAMICS
Mission Systems

SignalEye™

Automatic Spectrum Situational Awareness through Machine Learning



Machine Learning – signal classification using convolutional neural networks (CNN)

Data Driven – detection capabilities based on neural network training

Streaming – signal detection in streaming digital RF data

Software Only – solution runs on general purpose computer

Hardware Independent – RF front-end agnostic

Mission Independent – integrates with existing user-focused mission interfaces

Standards Based – supports VITA-49, VITA Radio Transport

Overview

General Dynamics' SignalEye™ solution provides spectrum situational awareness by automating the classification of signals through the use of machine learning. It provides tactical warfighters and security personnel with a timely, accurate view of the threat in the RF spectrum. It provides the strategic analyst the means to detect trends in the adversary's behavior.

SignalEye™ is a software solution that doesn't require specialized hardware acceleration. In a tactical context it deploys on a commodity hardware as an add-on to a RF front end system solution such as iRF's LiteRail™ or your existing receiver. In a classified or unclassified Amazon cloud context it scales to process petabytes of data.

SignalEye's automated situational awareness identifies dangers before it's too late, with the Curtiss-Wright CHAMP-XD1 rugged digital signal processor (DSP) offering exceptional processing capability to respond to and protect from threats.

> *"I can finally process my enormous signal backlog and get some RF context for my missions."*

SignalEye™

Features at a Glance

- Signal detection, isolation and classification
- Signal classification using Machine Learning
- Confidence Scores for signal classification results
- Stream-based and file-based processing
- VITA-49 format support
- Public, open API (C/C++, Python, Java, Scala) to display data on your mission focused GUI
- Built on open-standards for machine learning (TensorFlow) and orchestrating Docker containers (Kubernetes)

Metadata

- Modulation Type
- Center Frequency
- Bandwidth
- Signal-to-Noise Ratio (SNR) in dB
- Capture Start and Stop Time
- Capture Duration in Milliseconds
- Capture Time Offset in Milliseconds
- Neural Network Confidence

Modulation Types

Analog Methods

- Amplitude Modulation (AM)
  - Single-Sideband Suppressed-Carrier (SSB-SC-AM)
  - Double-Sideband Suppressed-Carrier (DSB-SC-AM)
- Frequency Modulation (FM)

Digital Methods

- Amplitude and Phase-Shift Keying (APSK)
  - APSK-16
  - APSK-32
- Amplitude-Shift Keying (ASK)
  - ASK-2
  - ASK-4
  - ASK-8
- Continuous Phase Modulation (CPM)
  - Continuous-Phase Frequency-Shift Keying (CPFSK)
    - CPFSK-2
    - CPFSK-4
    - CPFSK-8
  - Gaussian Minimum Shift Keying (GMSK)
- Frequency-Shift Keying (FSK)
  - FSK-2
  - FSK-4
  - FSK-8
- Orthogonal Frequency-Division Multiplexing (OFDM)
- Phase-Shift Keying (PSK)
  - 8PSK
  - Binary Phase-Shift Keying (BPSK)
  - Quadrature Phase-Shift Keying (QPSK)
    - General QPSK
    - $\pi/4$-QPSK
- Quadrature Amplitude Modulation (QAM)
  - QAM-8
  - QAM-16
  - QAM-128*
  - QAM-256*

** U.S. only*

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