RFvision-2 ELINT System With Pulse Analysis Software

SigInspector™-Pulseview Software supports spectrum scanning, wideband recording & pulse processing.

SigInspector™-Pulseview is the next generation ELINT software from D-TA Systems that leverages multi-core processing capability of RFvision-2 ELINT system which offers 500 MHz - 18 GHz spectrum scanning and 500 MHz stare BW. SigInspector™-Pulseview provides fully automated pulse detection and de-interleaving functionality for automatic emitter identification from continuous ultra-wideband records. The software enables the ELINT operators to focus on the content of automatically de-interleaved emitter signals rather than performing the signal sorting manually on the raw signal records. RFvision-2 & RFvision-360 (integrated SIGINT) Open-Architecture Electronic Warfare Solutions allow users to integrate their specialized analysis algorithms with the automated signal collection functionality provided with the SigInspector™-Pulseview software framework.

SigInspector™-Pulseview Automatic Detection and Intra-Pulse Analysis Software is used to evaluate I/Q recordings to automatically detect signals in the environment and extract PDWs. SigInspector™-Pulseview processes the continuously recorded digital I/Q samples and extracts pulse descriptor words (PDW) from the ultra-wideband record. PDWs contain the time of arrival (TOA), rise time, fall time, center frequency, pulse duration, pulse amplitude and modulation-on-pulse (MOP) information. The automatic detection is accomplished through the channelized soft receiver and application of subsequent noise riding threshold. Based on the estimated PDW parameters, the operator can conduct measurements on the pulse segments using the inter-pulse analysis screens. SigInspector™-Pulseview inter-pulse analysis software processes the extracted PDWs to automatically cluster and deinterleave the pulse trains corresponding to the distinct emitters. PDW clustering is based on state-of-the-art unsupervised learning algorithms. Subsequent PRI analysis is accomplished by the well-established hitogram-based methods and optimized sequence search. The constant, staggered (up to 32 levels) and jittered PRI types can be detected by SigInspector™-Pulseview. The software also provides inter-pulse analysis screens to enable verification and further analysis.

Major Features

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ELINT Processing With Four Simultaneous 80 MHz Tracks

4 Ch. (I & Q) Data

2 X 10 GbE Fibers Allow Remote Processing

DTA-3380E-4R (4 Channel Tuner)
20 MHz 18 GHz Frequency Range & 80 MHz Stare BW Each

DTA-5000 RAID Server (24 TB SSDs) with Pulsview software

RFvision1E-4R SYSTEM

ELINT Processing with 4 Independently Tuned Receivers offering four 80 MHz processing tracks

Sensor Processing Platform

The DTA-3380E Sensor Processing Platform interfaces with the RF Signal Distribution Unit (or directly with an antenna array) and digitizes four channels within frequency range of 20 MHz - 18 GHz, each having an instantaneous bandwidth of 80 MHz. The channels can be tuned independently (wideband stare mode) or in a phase coherent manner (for DF applications). The signals are digitized by 16-bit ADC’s for improved sensitivity. The samples are processed through DDCs to extract the digital I&Q samples and forwarded to Recording and Processing Server DTA-1000R over 2 x 10 GbE links in VITA-49 format. DTA’s Next Generation Server-Based Electronic Warfare solutions require no user level development for data acquisition and recording.

Clustering/Deinterleaving

SigInspector™-Pulseview enables automatic clustering of extracted PDWs using unsupervised learning. The automatic clustering assigns a cluster ID to collected pulses and reduces the computational complexity of subsequent inter-pulse analysis. The SigInspector™-Pulseview inter-pulse analysis software performs PRI estimation and tracking using well-established interval-based histogram analysis and sequence search. The constant, staggered (up to 32 levels) and jittered PRI types can be automatically identified and the resulting de-interleaved pulse train parameters are used to generate a “Emitter List” report to the ELINT operator. In addition to this, inter-pulse analysis screens are provided for verification of the automatic deinterleaving results and further analysis. The pulse collection functionality is also available as API for integration with user’s specialized analysis algorithms.

Automated PDW Detection

SigInspector™-Pulseview extracts PDWs from continuous raw signal records. The detection module performs “Soft Channelization” and “Noise Riding Thresholding” for automatic pulse detection. The intra-pulse parameters (frequency, amplitude, rise time, fall time, modulation) are estimated on a pulse-by-pulse bases and listed in a “Pulse List”. The ELINT operator can go through the pulse list and conduct further analysis on collected intra-pulse samples.

Automatic Emitter Identification

The parameters corresponding to deinterleaved pulse trains can be used to compare the emitters detected in the spectrum with the ones defined in the EOB (Electronic Order of Battle). The feature helps the operator to automatically indentify the target emitter types and focus on the contents of signals of interest than the entire raw I/Q records.

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