

## Description

NoISE™ is a SIGINT system for continuous RF emissions monitoring that can be used for counterintelligence, security (protecting areas such as SCIFs, airplanes, and embassies from unauthorized RF transmissions), and battlefield emissions geolocation. When operated in a network, NoISE™ uses Direction Finding or Time-difference-of-arrival (TDOA) techniques to geo-locate emitters

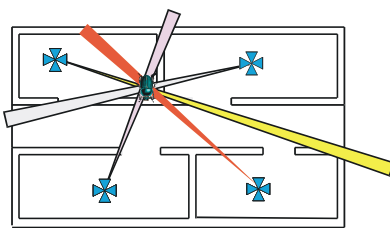


Figure 1: NoISE™ Geolocation of RF emissions

(Figure 1).

A traditional technique for monitoring RF emissions is to employ a spectrum analyzer with a fixed Resolution Bandwidth (RBW). This approach provides basic detection capability when the emitter's bandwidth is known with reasonable accuracy. However, the coherent signal to noise ratio (SNR) decreases by the ratio of Resolution Bandwidth (RBW) to signal bandwidth, with an associated reduction in the probability of detection.

NoISE™ employs innovative signal processing techniques developed at Engenium called the Pipelined Bisection Filterbank (PBF). This technique significantly improves probability of detection. Figure 2 illustrates the performance differential in mean time to detect an emitter with a spectrum analyzer versus NoISE™ as a function of Path Loss Differential (path loss of intended receiver minus path loss of interceptor).

For **geolocation** in outdoor applications, DF or TDOA techniques are employed. DF methods utilize multiple element antennas and networked receivers to estimate the location of the signal of interest. Estimation accuracy is improved by using three or more DF estimates with redundant information. TDOA techniques are based on estimating the difference in the arrival times of the emitter's signal at multiple receivers.

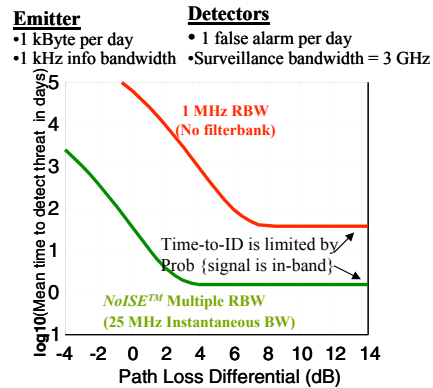


Figure 2: Performance Comparison of a Traditional fixed RBW system and NoISE™

For indoor applications where multipath may inhibit DF and TDOA, placing units inside and outside protected areas provides a means to discriminate between signals originating from outside the protected area versus those from within, including RF emissions that are meant to compromise security.

The NoISE™ processor is **FPGA based** (Field Programmable Gate Array) to accommodate parallel processing at high throughput rates.

## Features

- Multiple simultaneous resolution bandwidths increase the probability-of-detection and decrease threat identification time
- 30 MHz to 3 GHz detection capability
- Lower hardware complexity than parallel FFTs for multiple RBW filter banks
- Lower required pre-detection SNR
- Real-time geolocation using DF or TDOA
- Small size
- Low cost

## Development Status

A production prototype has been delivered. The prototype receiver is tuned in 50 MHz steps across a 900 MHz operational band and has a minimum RBW of 12 KHz. Development of a block converter to increase the input range to 3 GHz is planned.