



CUSTOMER APPLICATIONS

# Establishing a Permanent Record of Ground Truth

**IN THE WINTER of 2020, four branches of the military came together at White Sands Missile Range in New Mexico to conduct a regimen of tests on wireless receivers.**

These wireless receivers, used in critical national security missions, required testing for accuracy and functionality in a contested spectrum.

Domain experts across many different fields came together to complete this test regimen. With a personnel team of fifty, billing for every hour on the range, costs quickly escalated into the tens of thousands of dollars per hour. It was crucial that this investment generated a permanent record of ground truth.





## 📶 Problem Background

**Legacy test limitations.** The traditional approach to capturing ground truth in this environment utilized static spectrum analyzer plots on a periodic basis. The Navy recognized the limitations of this traditional approach. In the contested electromagnetic environment, hostile signals can appear and disappear so quickly they are missed by static plots.

Modern instrumentation has made it possible to move beyond this legacy test method. The Navy could capture and record the shortest spectral events, even those unobservable with the naked eye.

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## Spectrum Defender®

provided a direct, continuous record of the electromagnetic environment, thus becoming the single point of reference for any given moment in time.

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**Fog of war.** It was important that the Navy establish the conditions that their receiver was being exposed to at any particular moment in time. However, with the challenging logistics of executing complex field test scenarios, it was inevitable that the real world execution would deviate from the ideal plan.

It was impossible to be certain of the origin and timing for each signal. There was no opportunity for repeat

tests. A modern RF recording system would overcome the legacy test limitations and cut through the fog of war, establishing a permanent record of ground truth.

## 📶 Key Engineering Requirements

- 1 – Synchronized acquisition of two RF channels.
- 2 – Recording duration of 12 hours.
- 3 – SSD storage to operate in a mobile platform.
- 4 – Built for unattended test operation.
- 5 – Excellent dynamic range in a contested electromagnetic environment.

## 📶 Creating a Permanent Record

The Spectrum Defender SD-3836 system was the essential tool that created a permanent record of the electromagnetic environment. Unlike subjective reports from the field, Spectrum Defender provided a direct, continuous record of the electromagnetic environment. The team was confident they had captured a single point of reference for any given moment in time.

At the conclusion of their mission, the Navy left White Sands with a library of recordings. With Spectrum Defender instrumentation, they created a permanent record of the electromagnetic environment during their field tests. This library established the ground truth which serves as their reference point for determining—with certainty—the details on the test conditions to which their receivers had exposure. What occurred in the field can now be replicated in the lab.

All test participants of the military maximized their time and resources by testing in every possible condition in the field, stressing their device to the limits, and establishing a permanent record of ground truth. Armed with that clarity and confidence, plans for future field tests will be more informed than ever before.



## Find Your Ground Truth Solution

Spectra Lab designs instruments with multi-channel RF signal acquisition and reproduction functionality. Our typical customer has a specialized test need which cannot be met by conventional RF instruments.

Spectrum Defender belongs to a new class of instrumentation compared to legacy RF spectrum analyzers. We have an existing platform, an existing

code base, that's uniquely designed for simple adaptations and modifications. Without the risks associated with a full-custom design, we deliver an exact fit for your application.

Contact our experienced engineering team at **703-634-5290** to tell us about your ground truth challenge. **We're here to help design the test instrument that will enable you to establish a permanent record.** 



# Spectrum Defender®

Spectra Lab, LLC  
17873 Main Street, Suite C  
Dumfries, VA 22026 USA

**P** 703-634-5290 | **E** info@spectralab.com  
spectrumdefender.com

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