ERISYS Signal Analysis Software

Data Sheet — ZoomOut™ - Radar Module

Powerful toolkit for analysis of recorded radar and radar-like IQ signals

Overview

ERISYS **ZoomOut™** is an enterprise level, EW professional software suite that provides an integrated set of software tools for RF spectrum and signal **recording, analysis, signal creation, and playback.** This powerful software suite can help solve today's most difficult and challenging Electronic Warfare and RF communication issues.

ZoomOut™ is typically used with the ERISYS **SigPro** series of RF IQ recording, analysis, and playback equipment, the **SigPro-2000B, SigPro-4000B, SigPro-FEDS and/or SigPro-Hypervault**. The ERISYS SigPro system provides **ZoomOut™** with direct access in real-time to streaming IQ information during recording, as well as exceptionally fast access to all recorded IQ information on the **SigPro** system, no matter how large the files or recording duration. The combination of **ZoomOut™** software and the **SigPro** system provides users with unmatched speed of time-to-answer. **ZoomOut™** software can also be used on any Windows computer for off-line use, most often to analyze signals-of-interest that have been extracted from larger IQ recordings or to prepare test scenario IQ files.

The optional **ZoomOut™ – Radar Module** enhances the capabilities of **ZoomOut™ – Basic** and provides additional analysis tools that are useful for **radar and radar-like signals**.

Highlights

The capabilities provided by the **ZoomOut™ – Radar Module** include:

- **Visualization** – Provides enhanced dynamic three-dimensional visualization depictions with the ability to step any amount desired in the **time** and **frequency** domains.
- **Pulse Analysis** – Powerful tools for analysis of radar type signals. Capabilities include **waveform identification** and **signal recognition** based on correlation, power events, quick pulse and quick pulse with power analysis, pulse width analysis, and time domain stepping.
- **Pulse Search** – Flexible tools for **finding signals of interest** in very large IQ data sets. Some of the available search parameters include pulse width, power, frequency masks, fingerprint (correlation to a sample waveform), parameter defined exceedance searches, edge detection, threshold exceedance, and others.
- **Spectral Mask Search** – Create a Spectral Mask with the Spectral Mask Creation Tool in ZoomOut™. Use the mask to determine where power in frequencies exceeds the drawn mask.

![ERISYS RF SOLUTIONS logo]

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Data Sheet

ZoomOut™ - Radar Module

Capabilities

Some of the fully-configurable capabilities of the **ZoomOut™ – Radar Module** include:

- Time Overview
- Time Domain Stepping
- Time Domain 3D Stepping
- Pulse Analysis Tools
- Waveform Search Results and PDWs
- Waveform ID & Recognition using Correlation

Time Overview

The Time Overview tool within the **ZoomOut™ – Radar Module** is used to measure RF pulse parameters such as Center Frequency, Pulse Width (Duration), Pulse Interval (PRI), and other characteristics. The user has complete control over the displayed length of time and frequency limits.

The data displayed can be reprocessed using **Digital Down Conversion (DDC),** which can significantly reduce the noise floor and enhance the ability to identify and analyze weak signals that are close to the noise floor. DDC operates directly on the IQ data. Smoothing, which applies a configurable moving window average, can often significantly reduce displayed noise.
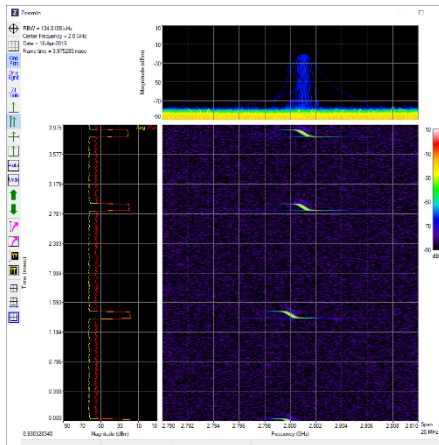
Capabilities include using cursors to precisely measure frequency, time, and power, single frame stepping one frame forward or backward in time, changing start and stop time limits, automatically locating pulses in a capture and providing basic parametric pulse data, and export displayed data to a new IQ data file that can be used with other tools for additional analysis such as demodulation.

Data Sheet
ZoomOut™ - Radar Module
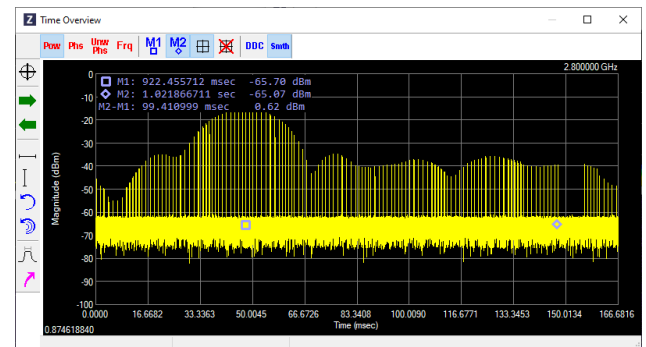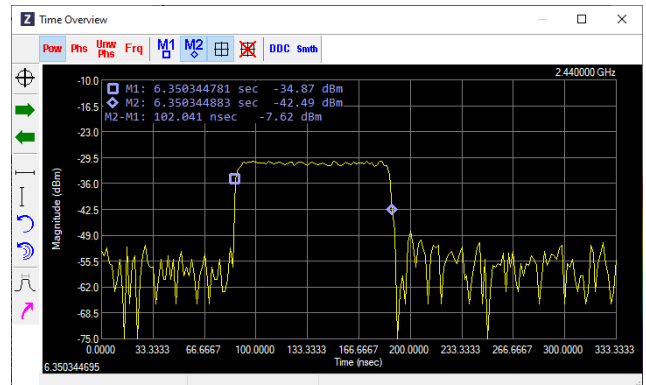
Time Domain Stepping

The Time Domain Stepping tool is designed to view repetitive signals such as radar pulses over time. For example, a pulsed waveform with a known PRI. This tool makes it possible for time domain traces to be "stacked" based on a user defined "step" or "frame". This allows visualization of the waveform PRI over time and provides the ability to detect changes in the PRI or other desired or undesired behaviors.

In the figure to the right a repetitive stimulus signal (on the left) is compared with the response of a system-under-test. In this example the response is "walking away". This tool is particularly valuable for studying how well a test system is implementing a particular technique, to assess trends over time, attenuation, power, etc.
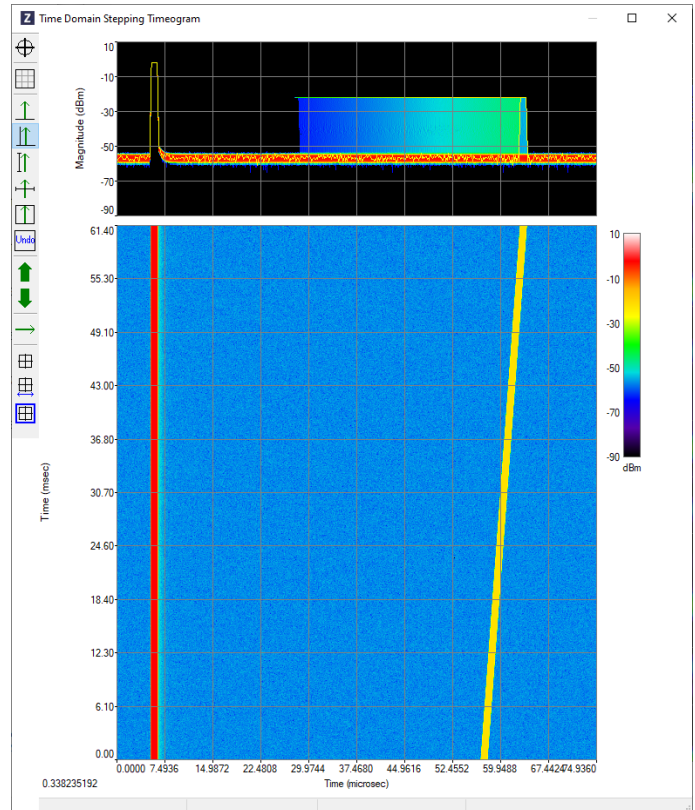
Time Domain 3D Stepping
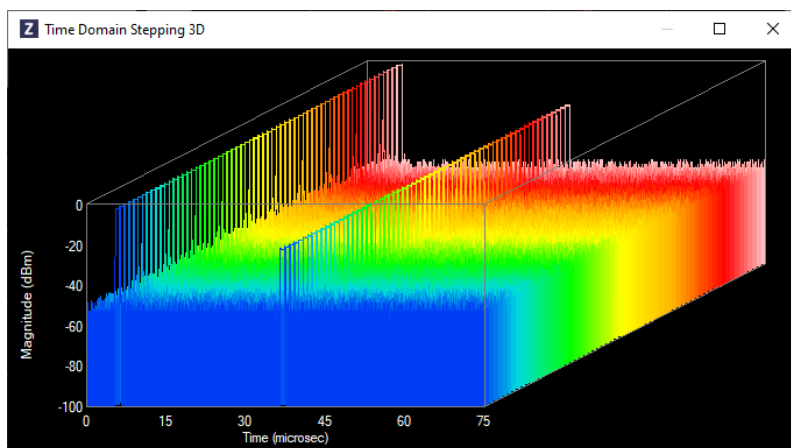
This tool is similar Time Domain Stepping, except that the data is displayed with a three-dimensional perspective. This view, which is completely configurable, can be very helpful to study stimulus and response behaviors. Times when an expected response is not being generated or distorted in some way can often be readily seen.

Pulse Analysis Tools and PDWs

Pulse tools in the ZoomOut™ Radar Module contain a dynamic set of tools to find pulses within the data capture in the time domain. Quick Pulse Search is an edge detection algorithm that finds sharp transitions in data. Pulse Search is the classic threshold with a smoothing feature added to allow detection with a low signal-to-noise ratio. Pulse Analysis can be added to any pulse search to calculate additional pulse parameters based on the results from the search.
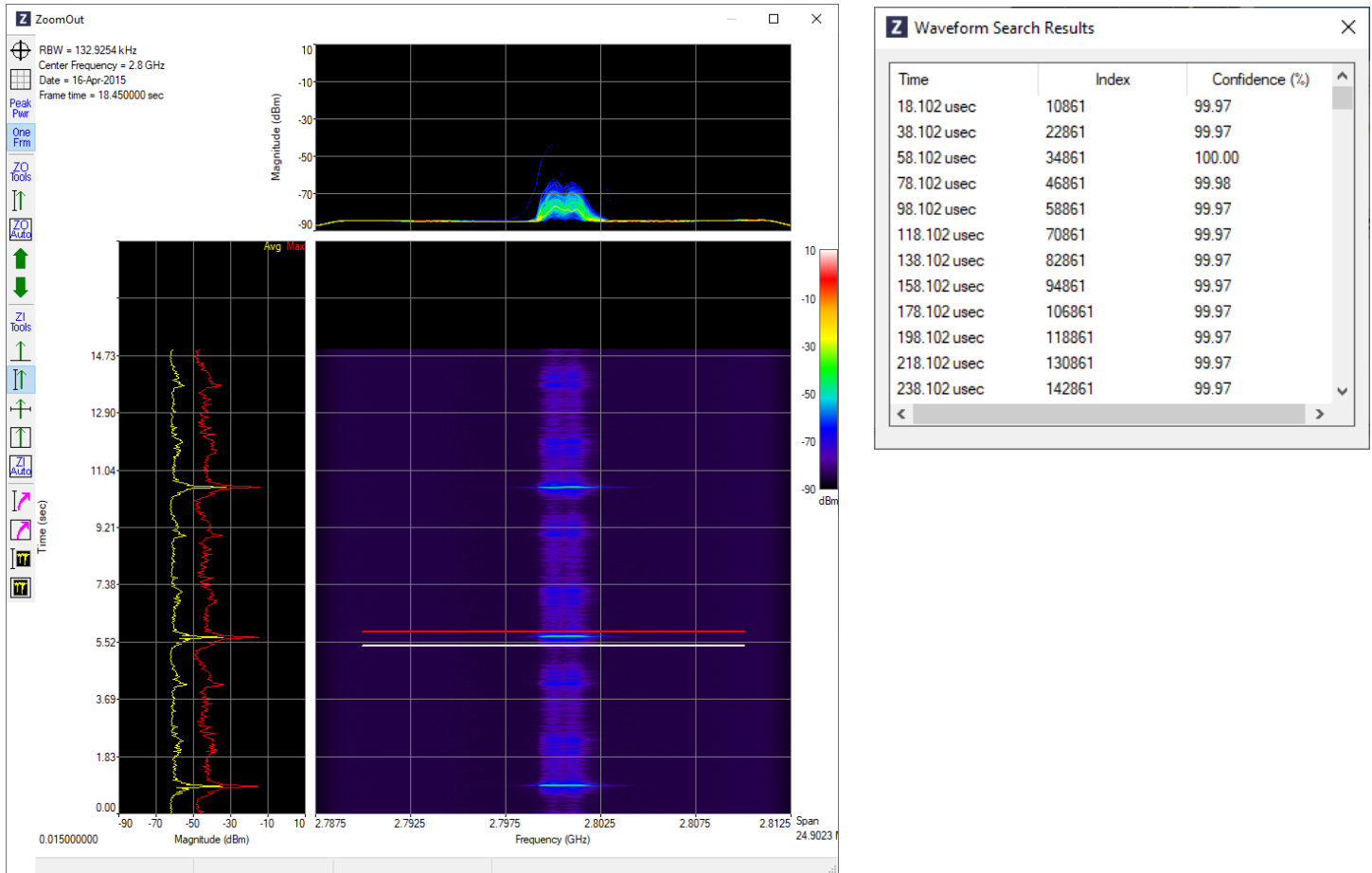

Any or all the pulses can be saved as segmented data simply by selecting the desired pulses and right-clicking. Save options range from an individual pulse, selected pulses, or all pulses. Saving pulses to a segmented file automatically removes the "dead time" between selected pulses. All timing information will be retained.

Search pulse parameters such as pulse width can also be set. Pulses can then be analyzed to determine specific characteristics such as rise time, fall time, etc.

Signals can also be processed in Pulse Descriptor Word (PDW) form. If attached to a R&S® SMW200A, a PDW stream can be sent and the SMW will transmit the corresponding RF pulses. The tool can convert RF pulses to PDW form.
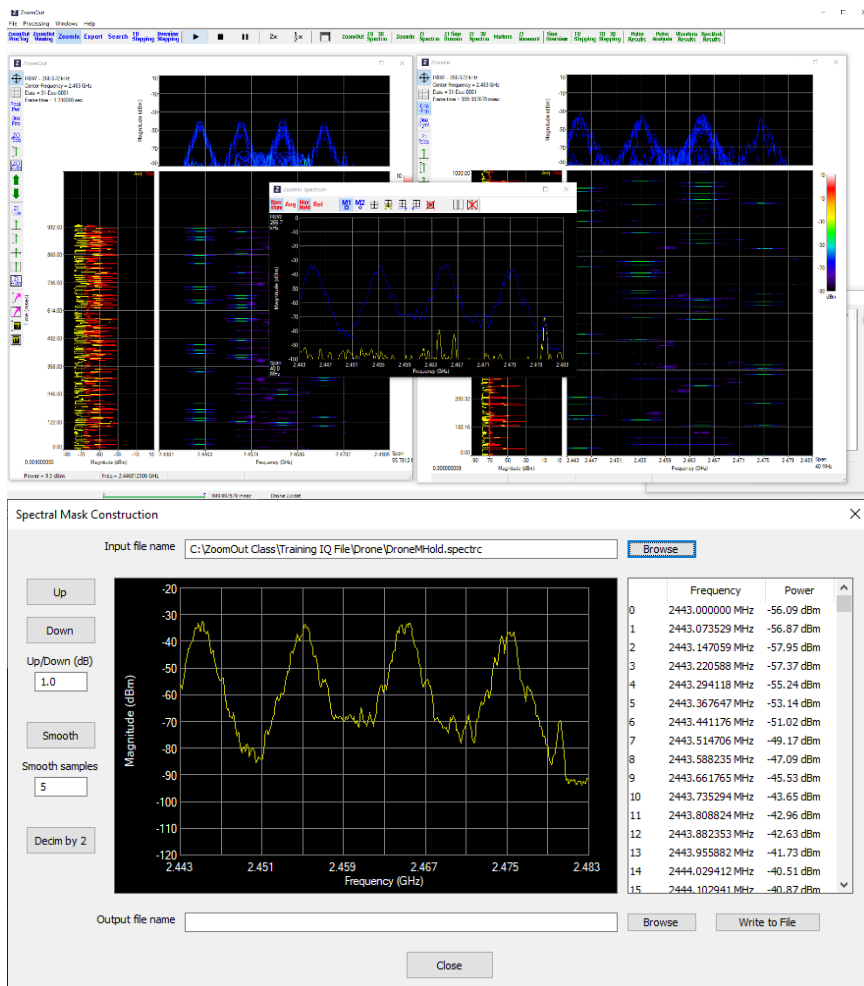
Waveform ID & Recognition using Correlation

This tool can be used to recognize waveforms matching specific characteristics using correlation techniques to match specific spectral content. Once identified, users can highlight a match and perform additional analysis using other tools within ZoomOut™ or external tools such as MATLAB® or R&S® VSE software.

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Spectral Mask Search

The Spectral Mask Search can identify where the spectral content exceeds the drawn mask. Simple or incredibly complex masks can be created in the Spectral Mask Creation Tool. Use the created mask to identify violations. Violations can then be channelized in time and frequency to create very specific user defined results. This search can be used for spectral monitoring and searching for transmissions at a specific frequency.

We can help solve previously unsolvable RF spectrum challenges.

For more information, please contact ERISYS RF Solutions for an on-site demonstration and consultation. We have decades of experience with RF Spectrum Analysis and generation.