

### *Software tool kit for spectrum recording, analysis, signal creation and playback*

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 SigPro system provides ZoomOut™ with direct access to all recorded IQ information on the SigPro system, no matter how large the files immediately after completion of a spectrum recording. This provides users with unmatched speed of time-to-answer. The ZoomOut™ software can also be used on a stand-alone basis on PC or Laptop computer using a Windows operating system.

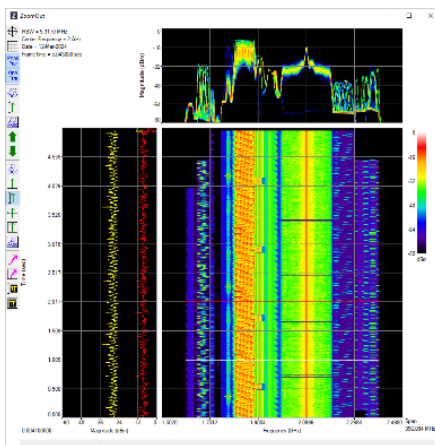
ZoomOut™ – Basic provides a powerful integrated set of signal analysis tools. Two optional software tools are available, ZoomOut™ – Radar and ZoomOut™ – Power Tools. These provide additional signal analysis tools that are useful for specific applications (See their individual data sheets).

### ZoomOut™ (ZO-Basic)

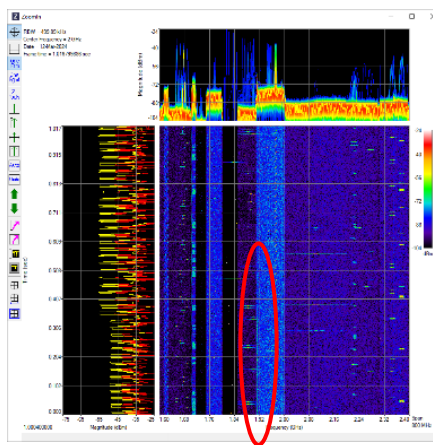
ZoomOut™ is used to visualize and analyze recorded spectrum IQ information and can be used on recordings of any size and bandwidth. Capabilities include:

- **Visualize** an entire multi-terabyte spectrum recording in seconds. With a few mouse clicks, examine signals of interest to nanosecond detail. Automated search tools speed up finding signals of interest.
- **Analyze** signals below the nanosecond level. Examine details in both **time** and **frequency** domains. Multiple simultaneous windows can provide macro and detailed views. Precisely measure signal parameters.
- **Extract and Store** signals of interest for detailed analysis, demodulation, and signal libraries. Data can be stored in several popular file formats. Interpolation, decimation, and filtering allow signals from different sources to be combined into complex test scenarios.

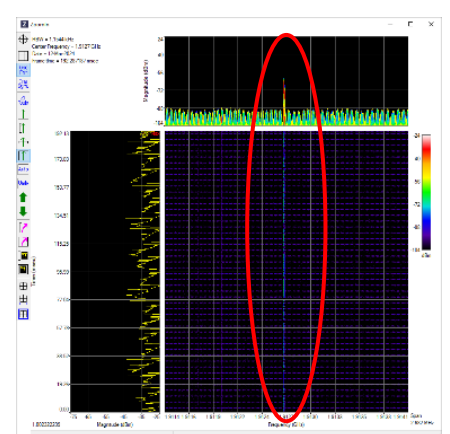
### Signal analysis example:



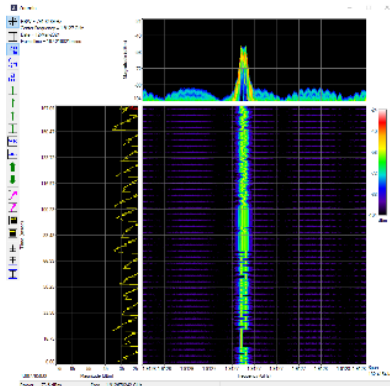
ZoomOut™ display of 5 second, 1 GHz IBW spectrum



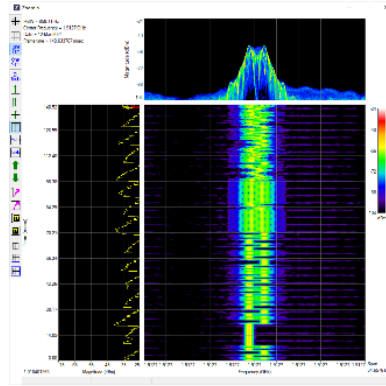
1 second of spectrum with a narrowband signal of interest



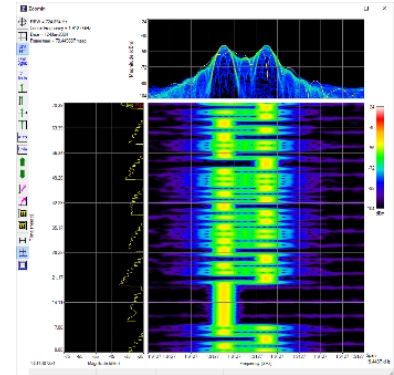
Zoom in on signal of interest found at 1.9127 GHz



Closer inspection suggests the signal is FSK modulation



At 3 KHz per division additional details can be seen

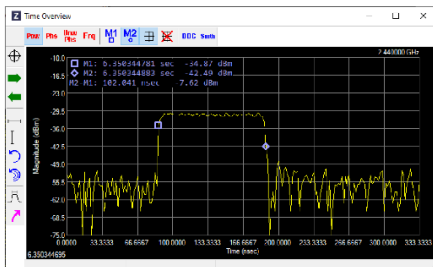


At 1.5 KHz per division / 700 Hz RBW the FSK bits can be seen

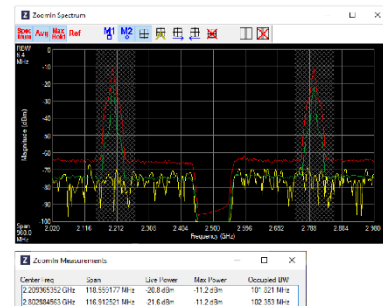
### ZoomOut™ - Radar (ZO-RADAR) (Optional ZoomOut™ Module)

ZoomOut™ - Radar provides additional signal analysis tools typically useful for Radar and EW Signal Analysis.

- **Visualization in three dimensions** and stepping in the **time** and **frequency** domains.
- **Pulse Analysis** tools for radar type signals including waveform ID, recognition based on correlation, power events, quick pulse and quick pulse with power analysis, pulse width analysis, and time domain stepping.
- **Pulse Search** tools to find signals of interest in large data sets including search parameters like pulse width, power, frequency masks, fingerprint (correlation to a sample waveform), parameter defined exceedance searches, edge detection, threshold exceedance, and others.
- **Statistical Analysis** tools to characterize signals by average power, pulse width variations, rise and fall times, peak power, PRI, PRI jitter, and others.



Time Domain visualization and pulse analysis



### ZoomOut™ - Power Tools (ZO-PWRTOOL) (Optional ZoomOut® Module)

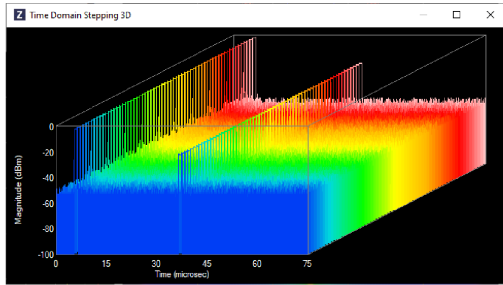
ZoomOut - Power Tools is an optional ZoomOut™ module that provides advanced analysis tools, Direct Digital Conversion (DDC) and third-party signal analysis.

- **Analysis** tools including ZoomOut 3D Spectrum and ZoomIn 3D Spectrum.
- **Digital Down Conversion (DDC)** tools that can isolate signals in close frequency and time proximity. Extract IQ information for individual analysis. Used to isolate low power signals that are near high power signals.
- **Data Reduction** tools including Segmented Memory Concatenation which can reduce IQ file sizes by several orders of magnitude without loss of information content by eliminating “dead time” between pulses.

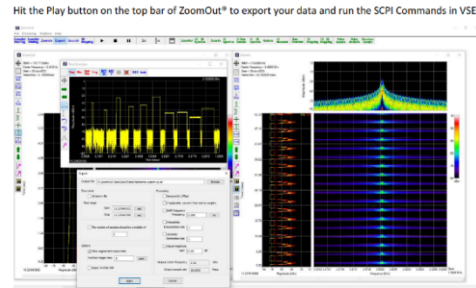
## Data Sheet

## ZoomOut™ Software Suite Overview

- **Export** signal IQ files to **R&S VSE** and **MATLAB®**. Simply “draw a box” around a signal of interest and export including SCPI commands to perform the desired analysis, returning the results to **ZoomOut**. Can be used very effectively without a detailed knowledge of VSE or MATLAB®.



Time domain 3D stepping in time domain



Export signals with SCPI commands to external R&S VSE

### QuadView (ZO-SPST) (Stand Alone Windows Software) Package)

**QuadView** can simultaneously display and combine up to four recorded IQ files. Provides capabilities that are like **ZoomOut™**, but for up to four files at the same time.

- **Display** up to four IQ recordings simultaneously.
- **Create Complex Playback Scenarios** – Quad View’s **Spectrum Stitch** can combine multiple IQ spectrum and signal recordings to create a single wide-bandwidth file of practically unlimited size containing a virtually unlimited number of signals, noise, and threats. Allows the system to be used as a **Threat Generator**.
- **Compare multiple IQ recordings** and precisely align in time for detailed relative analysis. Markers can be used to precisely measure differences in the time and frequency domains.
- **Align IQ files in time and frequency** by introducing precise time and frequency offsets.

### PIQ Compiler (ZO-PIQ) (Stand Alone Windows Software Package)

The **PIQ Compiler** can create sophisticated **RF spectrum test scenarios** by combining multiple IQ files including threat signals, actual recorded spectrum, noise, etc. Signals can be in **PDW or IQ form**. Numerous test scenarios that can be stored by the **SigPro** system for testing and/or training. Test scenarios can be of virtually unlimited duration and complexity.

### MapVu (Stand Alone Windows Software)

**MapVu** creates “heat map” depictions of geo-referenced spectrum data, typically recorded using a vehicle or aircraft. Broadband data can be channelized to create heat maps for different emitters using the same data sets.

### CellVu (ZO-CELLVU) (Stand Alone Windows Software)

**CellVu** provides software tools for analysis of modern cell phone signals including LTE and 5G. This includes LTE & 5G Physical Resource Blocks Analysis as well as the ability to calculate Channel Utilization.

### R&S Control (RSCTRL) (Stand Alone Windows Software)

R&S Control provides **single point programmable control** for **Rohde & Schwarz FSW spectrum analyzers and SMW200A signal generators** that are part of an ERISYS **SigPro** system. All equipment parameters can be automatically remotely configured and controlled.

### R&S Control - LiveVu (RSCTRL-LV) (Optional R&S Control Module)

**LiveVu** displays spectrum IQ data in **real time** as it is being processed by the **SigPro-2000B or 4000B** during recording and playback. Display options include **variable persistence** and **waterfalls**. **LiveVu** allows operators visualize spectrum as it is being recorded and to verify setting, trigger levels, modes of operation, and capture quality, etc. With **LiveVu** there is no need to look at the spectrum analyzer displays.

### R&S Control - PDW Conversion and Streaming (to SMW) (RSCTRL-PDW) (Optional R&S Control Module)

**PDW Conversion and Streaming (to SMW200A)** can simultaneously send up to **six** independent PDW output channels to a R&S SMW200A. PDW Conversion and Streaming can accept a wide range of text-based PDW formats and convert them into formats suitable for streaming to a R&S SMW200A. Pulse formats include **ZoomOut®** pulse analysis results. This software is typically used with customer provided signal libraries to seamlessly create correctly formatted PDW playback streams for an SMW200A.

### R&S Control - Advanced Triggering (RSCTRL-ATG) (Optional R&S Control Module)

**Advanced Triggering** can start a recording and/or provide precisely timed TTL triggers to external systems based on pulse parameters including pulse duration and power. Triggering can also be tied to GPS/IRIG timing. This capability can be used with live streaming as well as recorded data. Advanced Triggering requires a trigger board in the SigPro-4000B and FPGA firmware. Typical applications include:

- **Start a recording or SMW200A transmission** when a signal is observed that matches specified parameters.
- **Create blanking signals** to protect external devices from signals that may damage sensitive instruments.
- **Create marker files** recording precise time of arrival for pulses matching specified pulse width and amplitude.

### R&S Control - Frequency Mask Trigger (RSCTRL-FMT) (Optional R&S Control Module - Coming Soon)

**Frequency Mask Trigger** operates on real-time signal information and also can operate on stored IQ data. This is firmware that is installed on the **SigPro-4000** FPGA. Users can create **complex frequency - power masks**. Received signals that violate the mask can be configured to perform specific actions such as creating a marker file entry, starting a recording, issuing a blanking pulse, etc. **Frequency Mask Trigger** is a more sophisticated version of the basic pulse width and pulse power trigger capability supported by **R&S Control - Advanced Triggering**.

*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.