

R&S®IRAPS™: INTEGRATED RECORD, ANALYSIS, PLAYBACK SYSTEM

Products:

- ▶ R&S®FSW
- ▶ R&S®SMW200A
- ▶ ERISYS SigPro-2000
- ▶ ERISYS SigPro-4000

▶ ERISYS ZoomOut®

| Version 1.2 | 10.2021



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1 Overview

Platform verification with signals that reflect the real-world is always difficult, but is always the best approach to determine the true performance of the system. Performing test out in the real-world is not always possible for a number of reasons. To overcome these challenges, bringing the real-world to the test lab is often the best way to demonstrate system effectiveness.

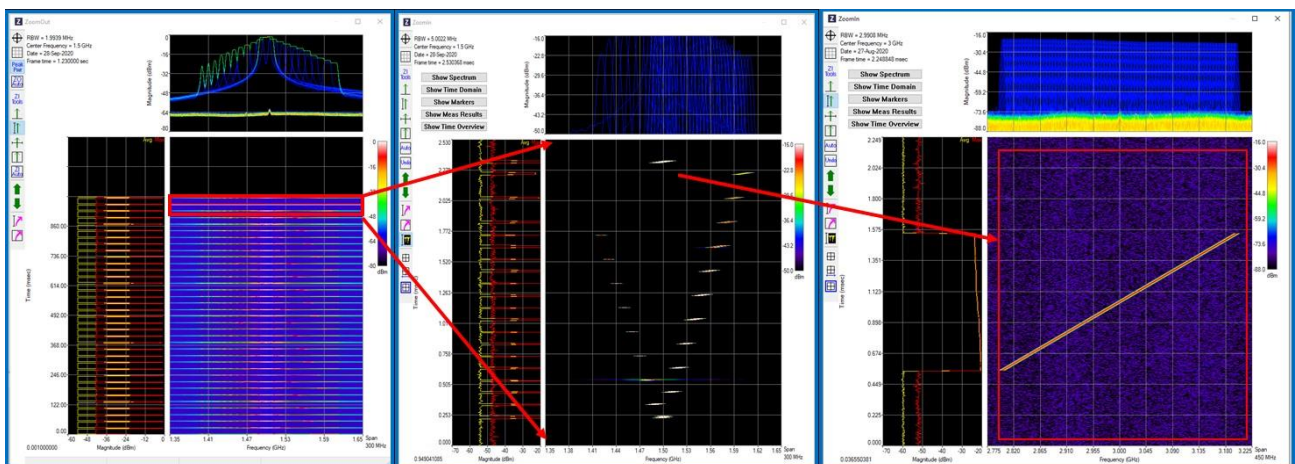
To capture the outside world, and find the signals that are of interest is a challenging, time consuming task. Without prior knowledge of when the signals will appear, long data captures of the RF environment must be taken. There is often great uncertainty knowing whether a recording was successful or not as a number of problems could have prevented a clean, usable recording from being generated. It may require extensive analysis to determine if a recording was successful or if another test run is required. Once the data is captured it is time to find the needle in the haystack. Sorting through lots of data to try and identify the signals of interest, which are usually at low power levels, and only last for a very short duration. These two time-consuming tasks must be performed before and testing can be started.

R&S®IRAPS™ enables the real-world RF spectrum to be captured, analyzed and played back in an efficient manner enabling quick and insightful analysis. The Erisys ZoomOut® software reduces the time it takes to identify the critical signals of interest. With high dynamic range, and long capture time you can be sure of capturing the signals of interest. Scalable devices allow multiple channels of recording and playback / emitter / environmental simulation. Unique and powerful analysis tools enable quick and insightful analysis tools that will identify these critical signals. Then testing can begin, with the playback of high quality, complex scenario that reflects the true environment that the system under test will face when deployed.

2 R&S®IRAPS™ System

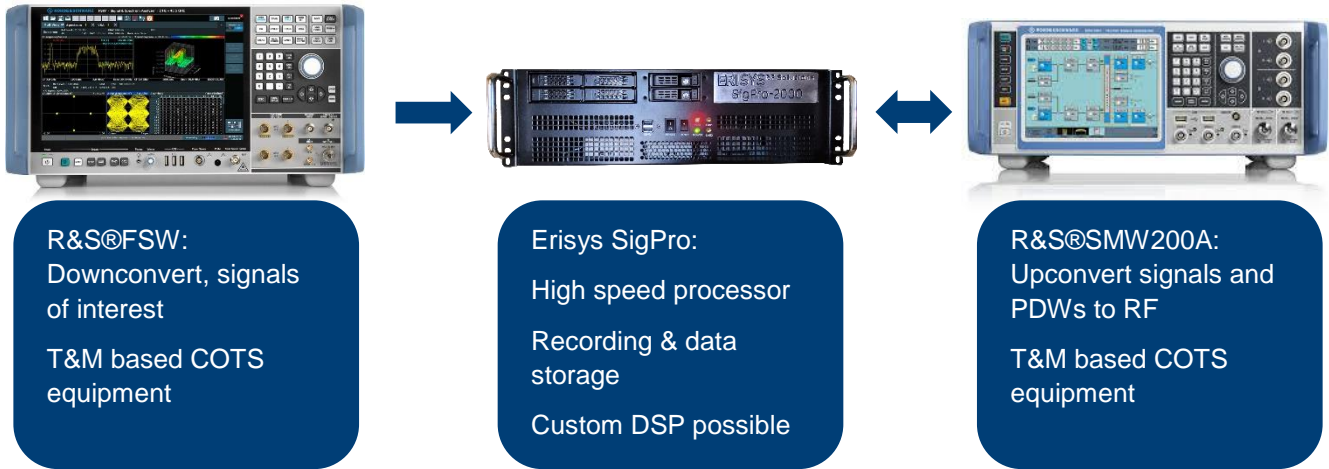
The R&S®IRAPS™ system is the Integrated Record, Analyze, and Playback System based on commercial off-the-shelf (COTS) test and measurement equipment. With 1 GHz of BW, signals can be quickly captured, identified and played back. System capabilities include:

- ▶ Capture and record signals over 3.5 hours of data at 1 GHz bandwidth
- ▶ High RF dynamic range with calibrated, COTS performance enables low levels to captured
- ▶ High RF dynamic range with calibrated, COTS performance and 1 or 2 channel signal generation with the industry leading R&S®SMW200A for signal playback, environmental simulation, multi emitter scenario generation, and more
- ▶ Scalable configuration: capture using up to 2 RF channels with 1 or 2 R&S®FSW spectrum analyzers, and playback with up to 4 RF channels with 1 or 2 signal generators.
- ▶ Fast results: near real time analysis with in line signal processing to display analysis as the the recording is complete
- ▶ Unique view to quickly determine if a recording is successful: view hours of data in a single display with no loss of data.
- ▶ Intuitive GUI allows easy navigation and zoom in on signals of interest
- ▶ Extract signals of interest from a recording, convert to a PDW format or use IQ segmented records for playback later.
- ▶ Create complex scenarios by combining captured signals with existing scenarios.



ZoomOut® Software: (1) first display shows entire recording without loss of any durations down to 1 sample long, (2) ZoomIn to specific portion of the recording for deeper analysis (3) ZoomIn further to individual pulse

3 Basic System Concept



Highlights

Erisys ZoomOut® Analysis Software

See the big picture: Analysis Software for long captures of electronic warfare, communications, and other signals.

- ▶ ZoomOut SW is a deep capture analysis software package which allows users to view/analyze large data files in the ZoomOut Summary Window while simultaneously using the ZoomIn Window to analyze the IQ Data of a smaller selected ZoomOut time slot.
- ▶ Export selected portions of IQ Data of signals of interest (IQ) to a file for further analysis or RF playback
- ▶ Quickly Search IQ file for pulses/bursts and analyze results in detailed pulse analysis table and Frequency / Power/ Phase verse time displays. Reduce data & export IQ or PDWs based on pulse search from recording.
- ▶ Create Pulse Descriptor Word files for analysis and stream PDW commands to R&S SMW200A for RF Playback of selected signal bursts/pulses.
- ▶ ZoomOut R&S Control software: Enables IQ data streaming via a R&S FSW Spectrum Analyzer for IQ data capture and a R&S SMW200A Signal Generator for RF Playback and provides setup/remote control via virtual front-panel displays for all R&S equipment

4 R&S®FSW Frequency Range and Bandwidths

RF Front End for recording system to receive signals. Also useful as a general-purpose high-performance spectrum and signal analyzer.

Model & Frequency Range	Recording Bandwidth Supported	Internal Analysis Bandwidth
FSW8	512 MHz	512 MHz
FSW13	512 MHz	512 MHz
FSW26	1 GHz	2 GHz

Model & Frequency Range	Recording Bandwidth Supported	Internal Analysis Bandwidth
FSW43	1 GHz	8.3 GHz
FSW50	1 GHz	2 GHz
FSW67	1 GHz	2 GHz
FSW85	1 GHz	2 GHz

FSW banner specifications (typical)

- ▶ TOI: +30 dBm (1 GHz)
- ▶ DANL: -169 dBm (150 MHz to 8 GHz)
- ▶ Phase Noise: -140 dBc/Hz (10 kHz offset, 1 GHz carrier)

FSW analysis capabilities

- ▶ Real Time Spectrum Analysis: up to 800 MHz, 0.46 us minimum signal duration for 100% probability of intercept
- ▶ Pulse Measurements: up to 200,000 pulses with IQ segmented memory and over 40 measurements: single pulse, trend and statistical analysis, uses up to 8.3 GHz integrated instrument bandwidth
- ▶ Vector Signal Analysis
- ▶ OFDM analysis
- ▶ Wireless standards analysis: 5G, WLAN, more

5 R&S®SMW200A Frequency Range and Bandwidths

RF Front End for recording system to transmit & generate signals. Also useful as a general-purpose high-performance vector signal generator.

Frequency Range	RF Channels	Streaming bandwidth	Signal bandwidth
Up to 44 GHz	Up to 2	1 GHz	2 GHz

SMW Key Specifications

- ▶ Phase Noise < -150 dBc (typ.) (20 kHz offset, 1 GHz carrier)
- ▶ Output Power: +18 dBm
- ▶ Frequency Response: < 0.4 dB (meas.)
- ▶ PDW Rate: Up to 12 M PDW/Sec
- ▶ Number of PDW Streams: Up to 6

SMW signal generation capabilities

- ▶ Stream up to 12M PDW/second to create emitter dense RF environments
- ▶ Create Pulse-on-Pulse scenarios by streaming up to 6 parallel PDW streams
- ▶ Two independent RF Outputs enable multi-band testing
- ▶ Easily add in commercial wireless signals to create real world RF Environments
- ▶ Two Baseband Generators enable two waveforms to be combined in to RF signal
- ▶ Excellent RF Performance will ensure accurate test results
- ▶ Multi-channel box is ideal for Phase Coherent generation

6 Erisys SigPro Series Recording Analysis Systems

The Erisys SigPro series system is a Vector Signal Processor with High Speed Fiber Connectivity. The systems provide standard integrated functionality with the Erisys ZoomOut® software. The SigPro systems can also be customized with tailored DSP processing for real-time signal development.

Erisys SigPro Series Vector Signal Processors

- ▶ Fast processing – nearly instantaneous analysis of recording with Erisys SigPro-2000 and Erisys SigPro-4000
- ▶ SigPro-2000 and SigPro-4000: high speed data link, dedicated high speed FPGA and CPUs for large amounts of signal processing
- ▶ Up to 60 TB recording: approximately 3.5 hours for a single channel at 1 GHz recording bandwidth
- ▶ Secure with removable SSD's and no sensitive information left on device
- ▶ IRIG-B and GPS timing synchronized
- ▶ SigPro-2000: 2 instruments connected: 2 R&S FSW's, 1 R&S FSW and 1 R&S SMW
- ▶ SigPro-4000: 4 instruments connected: 4 R&S FSW's, 2 R&S FSW and 2 R&S SMW, etc.
- ▶ SigPro-2000/SigPro-4000: additional custom DSP available for real-time signal development

[Contact your local Rohde & Schwarz Account Manager for configuration and pricing.](#)

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