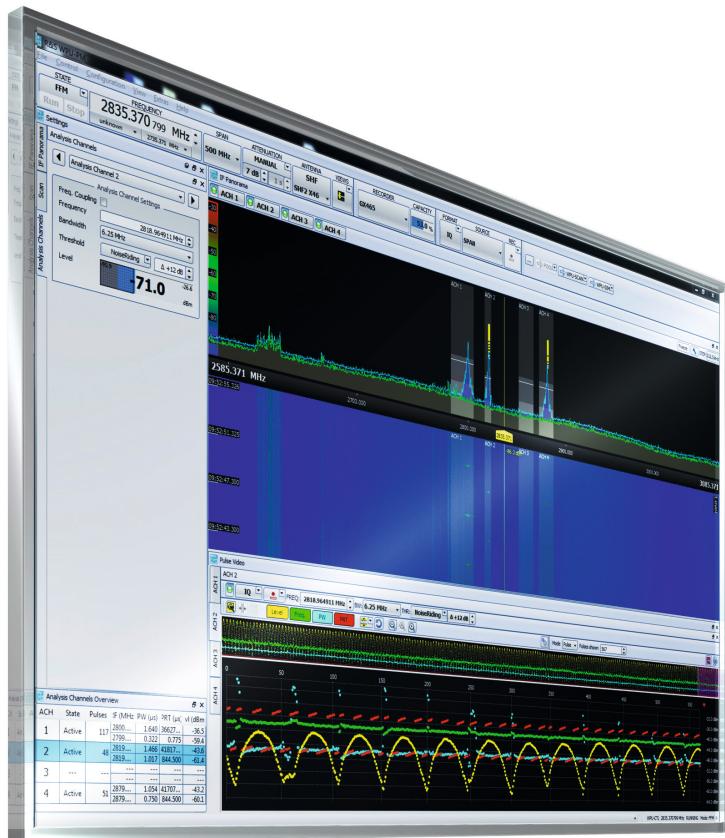


Radar Signal Collection and Analysis System

Complete digital radar signal search, collection, measurement and analysis system



Radar Signal Collection and Analysis System

At a glance

The radar signal collection and analysis system is an advanced search, collection, measurement and analysis system that can be used on almost any platform in any signal environment. The system is focused on operator usability and functionality. The devices and system software complement each other and contain many features that support the operator in dense signal environments. The system software controls all the devices in the collection system, contains intuitive, operator-friendly GUIs and provides database storage, search and data display.

The radar signal collection and analysis system is a fully digital, manually operated radar signal search, measurement and analysis system that uses state-of-the-art components and technology. The system contains one or more digital receivers that each use a 500 MHz IF bandwidth and produce pulse descriptor words (PDW), I/Q descriptor words (IQDW) and continuous I/Q data. The system also contains advanced radar measurement and analysis software and an integrated wideband digital recorder.

To meet the demands of collecting signals in the modern radar environment, the radar collection system is both highly sensitive and features a high probability of intercept (POI).

One of the benefits of the system is that the hardware and software have been developed alongside each other, and therefore complement each other perfectly, providing the operator with a fully integrated collection system that is specifically designed to complete any radar signal collection task.

The system solution is based on the many years of operational experience and technical excellence within the company. It has been developed solely to provide a modern technical solution to all the different challenges encountered during a radar signal collection mission. The features and benefits of the system have been implemented to achieve the required functionality and are not dependent on existing software or hardware solutions. The features are implemented where they provide the greatest benefit to the operator.

Key facts

- Turnkey solution for radar signal collection and analysis, ideally suited to electronic intelligence (ELINT) and radar electromagnetic spectrum applications
- Interception and analysis of modern low-power, low probability of intercept (LPI) radar signals
- High-quality lossless digital signal processing for accurate interpulse and intrapulse analysis
- Fully flexible and scalable from single operator solutions to nationwide collection systems
- Control of remote collection sites via WAN
- Integrated workflow and data management for efficient operation

Radar Signal Collection and Analysis System

Benefits and key features

Efficient operation in complex signal scenarios

- | Integrated radar signal collection and analysis system
- | Multichannel operation in dense signal environments
- | Efficient search, collection and analysis of modern pulsed and CW radar signals
- | Powerful radar signal analysis
- | Integrated operator's radar database

[▷ page 4](#)

Highest data quality

- | PDWs, IQDWs and continuous I/Q data accurately visualize all radar and pulse parameters
- | Complete digital design preserves the frequency and phase characteristics of the radar signals
- | Digital I/O recording provides lossless post-processing and high-quality results
- | Integrated data management

[▷ page 13](#)

Future-ready system design

- | Fully digital collection and analysis system
- | Single operator systems to nationwide integrated systems
- | Remote control of unmanned or detached receiver sites
- | Open interfaces

[▷ page 17](#)

Low-risk turnkey solution

- | Tried and tested system from a single supplier
- | Integration into almost any type of platform
- | Low integration costs
- | Post-project support
- | Customer-specific integration
- | Operational and technical training

[▷ page 18](#)

Efficient operation in complex signal scenarios

Integrated radar signal collection and analysis system

Electronic intelligence (ELINT) is the collection and analysis of signals that are transmitted by a radar system. Organizations conduct ELINT to learn the capabilities of a radar system. Military radar systems are always common targets for ELINT operations. ELINT is normally conducted by military platforms that are fitted with specially designed systems by specially trained collection operators.

There are a number of general requirements that a modern ELINT system should meet:

- The system has to be manual. Operators need to be in control of their system at all times. Although the system is manually operated, it needs to operate as quickly as possible and be as intuitive as possible
- The system must contain powerful analysis software. The collector has to be able to observe, identify and measure the parameters of the transmitted radar signal
- The system must produce high-quality data that an ELINT analyst can later use to characterize a radar signal
- An ELINT system must be as sensitive as possible and be able to record radar data in different formats that can accurately describe the many different radar parameters that are found in the modern world
- Recording radar signals requires a great deal of storage space in the system. So an integrated data storage solution and data management systems should be an integral part of an ELINT system

Rohde & Schwarz offers a complete portfolio of radar signal collection and analysis components that have been designed and developed simultaneously. This ensures that the software and hardware complement each other perfectly and provide the operator with a fully integrated solution that is designed to successfully complete any wideband monitoring task. The radar collection solutions are ideally suited to ELINT collection and analysis tasks.

To support system delivery, Rohde & Schwarz offers a range of services such as project management, system engineering and operator training.

The devices and software components that are described in this brochure benefit from the company's extensive experience in designing, producing, installing and maintaining communications monitoring, recording and signal identification systems. The system described here is a complete wideband signal collection system that has been designed to be integrated into almost all collection or radar electromagnetic spectrum monitoring platforms.

The system is designed to be scalable and can therefore be deployed as a small single operator system or integrated into a much larger nationwide monitoring and collection system. The system can be remote controlled even via wide area networks (WAN).

The example shown in the following diagram is a two-operator system. Both of the positions are interchangeable and therefore have the same functionality. In an operational scenario, one of the positions (operator 1) would be responsible for the collection and first line analysis of radar signals. The second operator position (operator 2/supervisor) would act in a supervisory role and be responsible for directing operator 1. The supervisor would also, when required, be responsible for the analysis and identification of complex radar signals.

This system has a frequency range from 20 MHz to 18 GHz. Frequency extensions down to 9 kHz or up to 40 GHz are available on request.

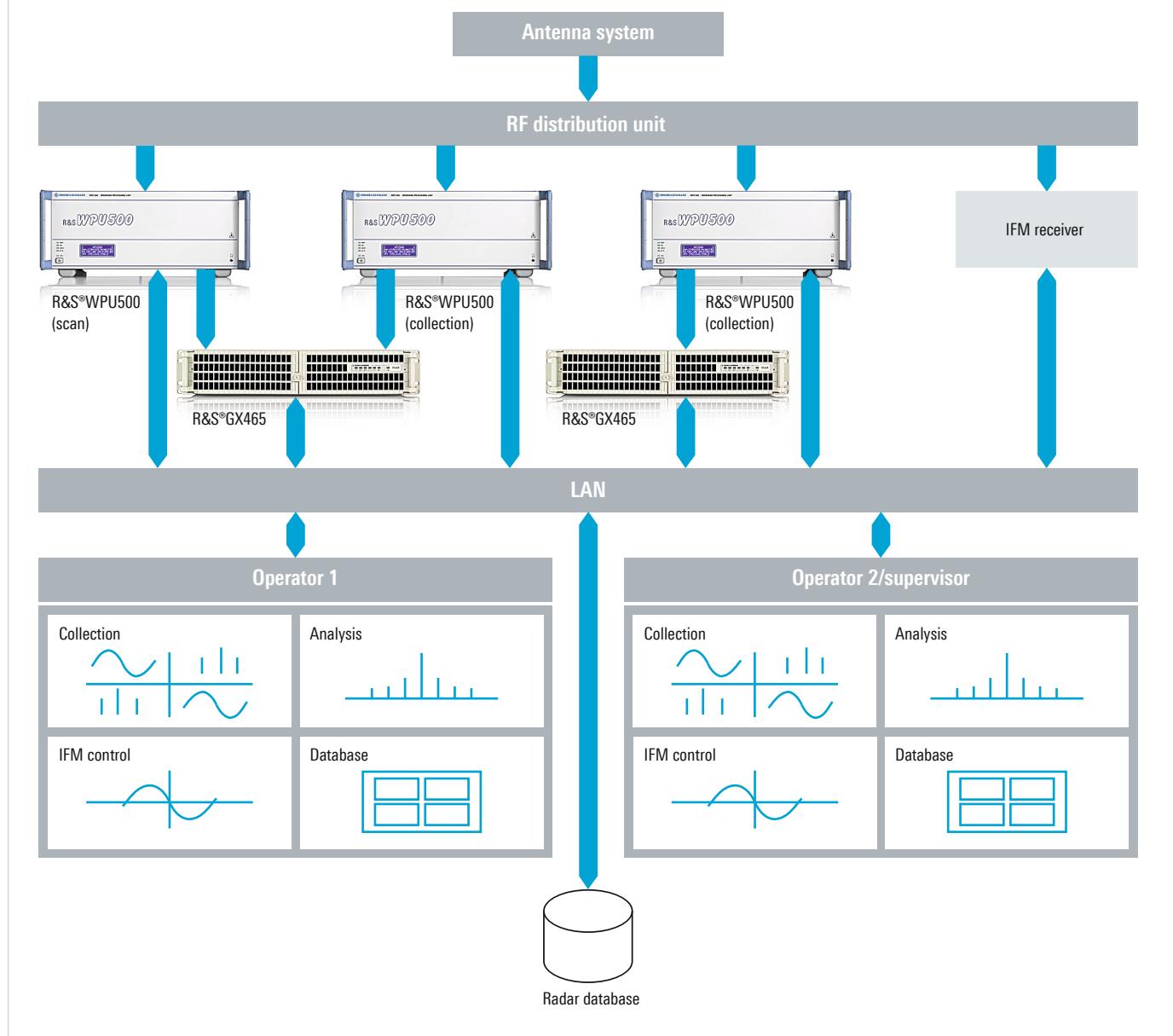
It features three tunable and highly sensitive 500 MHz bandwidth R&S®WPU500 wideband processing units. Two are for the collection and analysis of radar signals; the third is set up as a spectrum scan. This configuration gives operators the flexibility to monitor the spectrum while collecting and analyzing radar signals.

This system, shown below, contains a wide-open 2 GHz to 18 GHz integrated instantaneous frequency measurement (IFM) receiver with wideband control software and synthetic receivers for wideband radar signal collection and analysis.

Two R&S®GX465 I/O recorders are included. This enables simultaneous wideband recordings from all R&S®WPU500 controlled from both operator positions.

The system software includes R&S®WPU500 control and all online visualization software (R&S®WPU-CTL), operator's database (R&S®RA-DBRAD) and data presentation suite (R&S®RA-PS-RAD). This system contains two R&S®TPA technical pulse analysis software suites.

Radar signal collection system comprised of Rohde & Schwarz devices and software components



Multichannel operation in dense signal environments

The radar signal collection and analysis system is modular and contains specially designed software that is ideally suited to many different wideband signal collection scenarios. It is particularly suited to ELINT collection and analysis or wideband spectrum monitoring tasks. It has been specifically designed to operate in the dense signal environments commonly encountered in modern operating areas.

The core of the system is the four-channel R&S®WPU500 wideband processing unit. This unit contains four independent pulse detectors and pulse processors with specifically developed signal visualization and collection software. The benefit of this configuration is that the R&S®WPU500 has in effect four individual pulse analyzers per bandwidth.

The analysis capability is provided offline by R&S®TPA, which is the powerful radar signal measurement and analysis software contained in the system.

For signal acquisition and analysis the R&S®WPU500 has two different operating modes. These support the operator when they need to quickly acquire, collect and identify radar emissions.

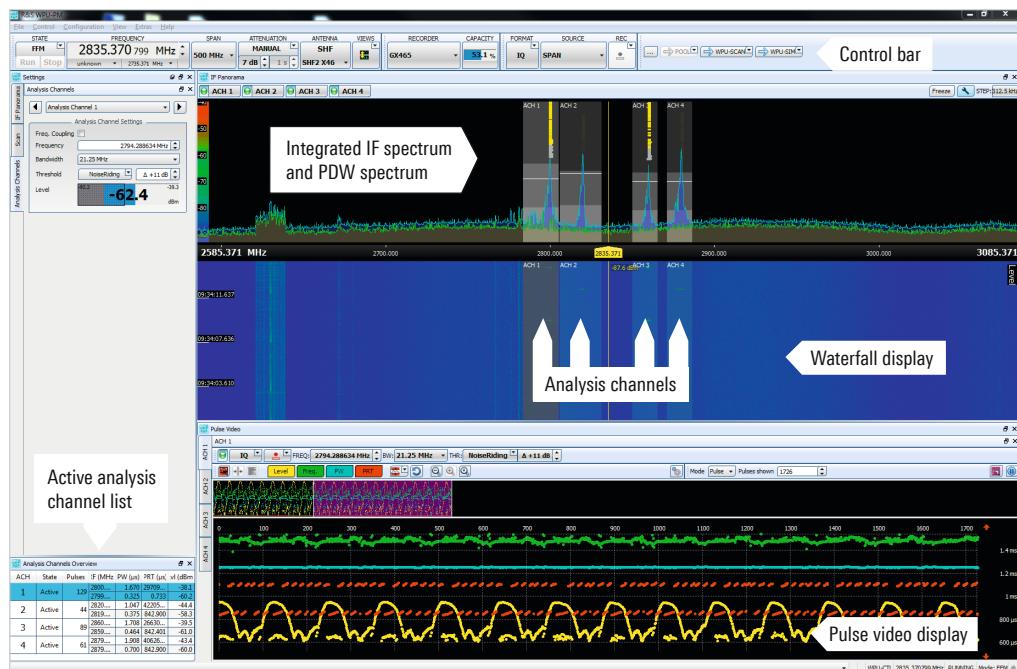
For acquisition the R&S®WPU500 uses a panorama scan (PSCAN). In this mode the R&S®WPU500 will quickly scan through the RF spectrum, detect the energy from all signals and display it in a continuous RF spectrum display. This provides the operator with an overview of the radar signals that are active throughout the radar spectrum. The R&S®WPU500 is fully network capable so it is therefore very easy for the operator to hand over active radar frequencies from a scanning R&S®WPU500 to an analysis R&S®WPU500, saving the operator time during the collection process.

The PSCAN start and stop frequency parameters are operator selectable. The operator is therefore able to continuously search through frequency ranges of expected or known activity.

When an active radar frequency has been handed over to the R&S®WPU500, it will be observed in an R&S®WPU500 in fixed frequency mode (FFM). In this mode the operator will observe the IF spectrum, PDW spectrum and waterfall display.

The R&S®WPU500 control software can show the output of each analysis channel simultaneously online in a pulse video display. In addition to PDWs, the analysis channels also produce IQDWs for intrapulse analysis.

The diagram shows the R&S®WPU-CTL software. The device control GUI, with the spectrum, waterfall and pulse video display, is clearly seen. The four analysis channels have been positioned in the IF spectrum. The online PDW output from one of the analysis channels is visualized in the pulse video display.



The pulse video display is a multifunction PDW display. It plots time in the x axis against the common radar parameters in the y axis. It is fully flexible and allows the operator to zoom in/zoom out, rescale and move the position of the parameters in the display. The benefit of this is that the operator can observe the relationships between radio frequencies (RF), pulse durations (PD) and the pulse repetition time (PRT). This is especially useful when complex radars that use many variable parameters have been collected.

It also contains a channel history display. This shows the operator the PDW history of the analysis channel. The benefit is that the operator can observe the signal of interest online and select a segment of the radar signal that will be transferred to the analysis software. This could be when the radar changes mode or any other event. When the operator has selected the period of interest, it is transferred to the analysis software, where it is measured using the system's powerful radar signal analysis software.

The operator can zoom in to both axes, rescale them and observe the RF, PRT, PD and scan characteristics of the signal online.

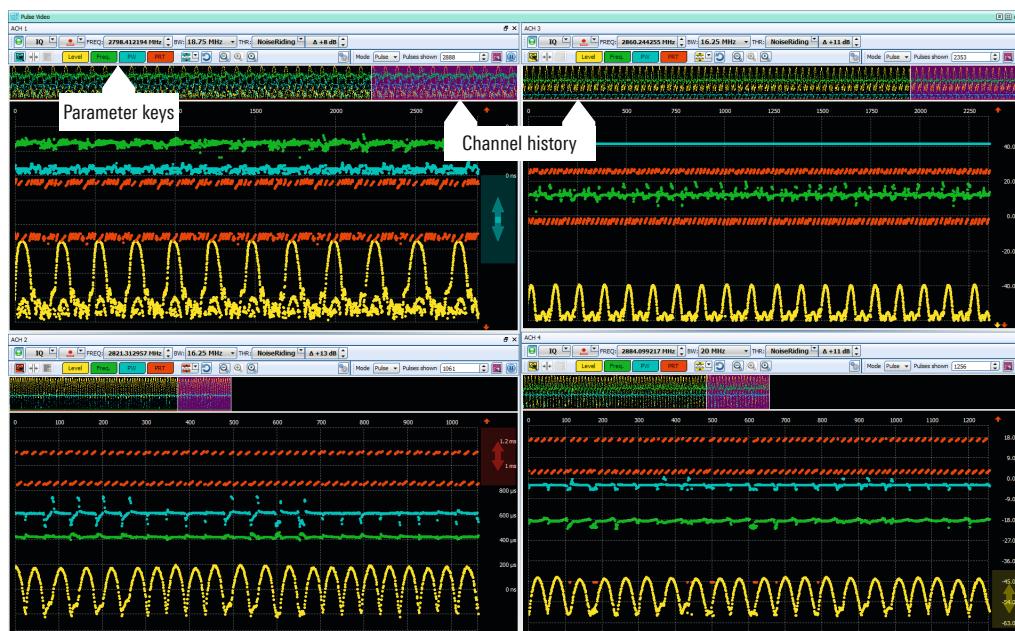
Each analysis channel produces PDWs that are displayed online in the pulse video display. In addition, the IQDW data from each PDW is also temporarily stored inside the R&S®WPU500. The IQDW data from the internal storage is available to the analysis software for intrapulse analysis.

The R&S®WPU500 control GUI also controls the R&S®GX465 digital wideband storage device. In addition to its internal storage capability, the system can stream the IQDW output from all four analysis channels to the R&S®GX465 simultaneously if required.

In addition to PDWs and IQDWs, each analysis channel produces continuous I/Q data. If required, the I/Q output from the analysis channels can be streamed to the R&S®GX465.

The R&S®WPU500 display is straightforward and provides the operator with an accurate visualization of the operating environment. The intuitive system enables the operator to concentrate on the job at hand without having to worry about complex software or confusing workflows.

This diagram shows the output from the four analysis channels in the pulse video display.



Efficient search, collection and analysis of modern pulsed and CW radar signals

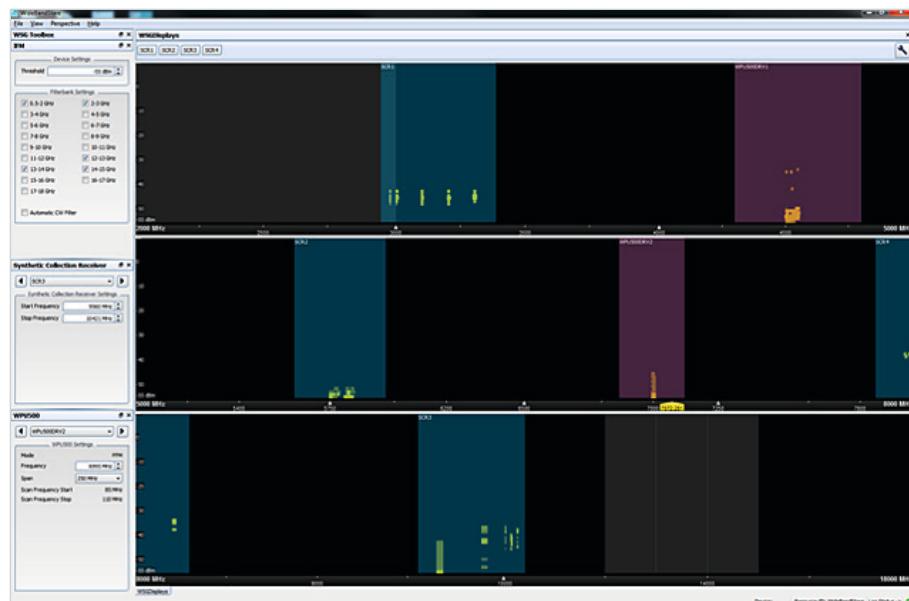
The R&S®WPU500 has two operating modes. One is fixed frequency mode (FFM), used when the operator needs to collect a signal of interest. The other is the panorama scan (PSCAN), which is used when the operator is required to scan the RF spectrum looking for signals of interest. Both operating modes are supported by the R&S®WPU-CTL software.

If two R&S®WPU500 are used in a collection system, one in a PSCAN mode, the other in FFM, the operator will be provided with the ability to continuously monitor the radar spectrum for new signals while collecting radar signals or analyzing previously collected signals.

The R&S®WPU500 can be used with either the R&S®WPU-CTL or a separate wideband scan GUI. It is therefore possible to select the wideband GUI that is better suited to the operational requirement. Both wideband scan GUIs are used with the PSCAN mode.

R&S®WPU-CTL provides an integrated spectrum and waterfall display, which helps the operator to quickly identify RF agile radars and also the type of agility used.

The wideband spectrum overview displays the frequency range of the R&S®WPU500 across three separate RF spectrums. This provides the operator with a detailed view of the frequency spectrum and therefore the current radar activity.



The wideband spectrum overview GUI supplied with the IFM. The four synthetic collection receivers (SCR) can be seen in the highlighted areas in the diagram.



Each SCR has four analysis channels. An SCR can be seen in along with two analysis channels. The PDW output of the channels can be seen in the lower half of the diagram.

In larger systems that use many R&S®WPU500, the wideband spectrum overview GUI displays the different positions in the RF spectrum that all the R&S®WPU500 in the system have been tuned to. This benefits the operator in cases where more than one collection and analysis system must be operated simultaneously or where multiple R&S®WPU500 must be tuned simultaneously. The features in this GUI make it easy for the operator to control all the R&S®WPU500 in the system.

Any active radar frequencies can be handed over from an R&S®WPU500 in PSCAN mode from either of the search GUIs to an R&S®WPU500 that is being used for collection and analysis.

An IFM receiver can be included in the system to provide an instantaneous overview of the radar spectrum from 2 GHz to 18 GHz. The IFM uses the wideband spectrum overview GUI to show the emissions in an RF versus amplitude PDW display. The difference is that the output of the GUI when used with the IFM is a PDW spectrum, whereas when used with the R&S®WPU500 in PSCAN mode the output is an RF spectrum.

The wideband spectrum overview GUI uses a synthetic collection receiver (SCR) concept. There are four SCRs per system. Each SCR contains four independently controlled analysis channels. This gives a total of 16 different analysis channels.

The SCRs are fully flexible and can be placed anywhere in the spectrum. There are a number of benefits to the SCR concept. As the IFM receiver has a bandwidth between 2 GHz and 18 GHz, an SCR can be used when it is necessary to collect and analyze a radar signal that is RF agile and has a transmission bandwidth wider than 500 MHz. The SCR is placed around the wideband signal of interest and the PDWs can be collected. The PDW data is then analyzed using the R&S®TPA software.

The SCRs can also be used during periods of increased activity in dense radar environments. An SCR can be used to provide a zoom function into the spectrum, and then the individual analysis channels are used to isolate the individual signals. This subsystem is fully network capable, and all data collected by the system can be analyzed and stored in the system.

In the modern radar environment the current requirement is to provide as high a POI as is possible and at the same time to be as sensitive as possible. The radar collection and analysis system is designed with these requirements in mind. The combination of high sensitivity and high POI from the scanning R&S®WPU500, with the addition of an IFM, provides as near to 100% POI as is currently possible.

The operator needs to see the powerful signals that are active in the frequency spectrum, typically pulsed signals with a high peak power and in some cases high duty cycle, but also needs to detect modern low-power signals, including continuous wave (CW) and frequency modulated continuous wave (FMCW) radars throughout the radar spectrum.

The separation of weaker signals from stronger signals is achieved in the R&S®WPU500 by using the four analysis channels. They provide an added benefit of isolating weaker signals with lower energy from the stronger high-energy signals. This avoids pulse collisions during the collection process, and as weaker signals can be isolated, the signal-to-noise ratio is improved.

The ability to isolate low-power signals from high-power signals supports the operator when low probability of intercept (LPI) signals such as CW and FMCW radars need to be collected.

Powerful radar signal analysis

The radar signal collection and analysis system contains the R&S®TPA software. This is a powerful suite of pulse detection, visualization and measurement tools for analyzing pulsed, CW and FMCW signals.

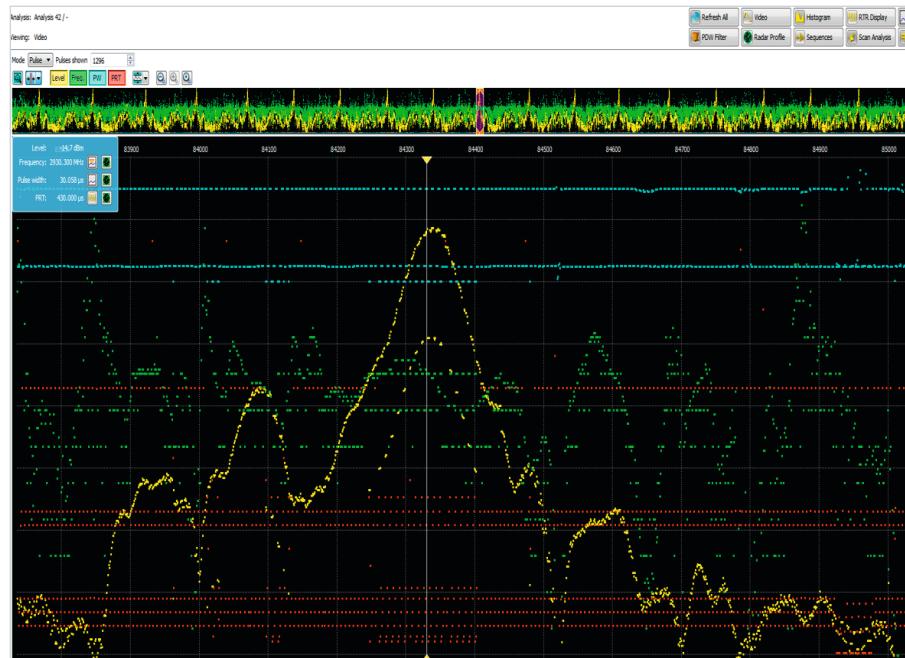
R&S®TPA clearly visualizes the PDW and IQDW data produced by the R&S®WPU500 and has been designed to be intuitive which ensures that operators produce accurate results with a minimum of familiarization training.

R&S®TPA contains a multifunction pulse video display that is designed to enable operators to clearly display and manipulate the individual radar parameters to present the clearest displays to the operator.

R&S®TPA contains time-based I/Q and IQDW displays for intrapulse analysis as well as a spectrum and spectrogram display for analyzing the time/frequency behavior of radar signals.

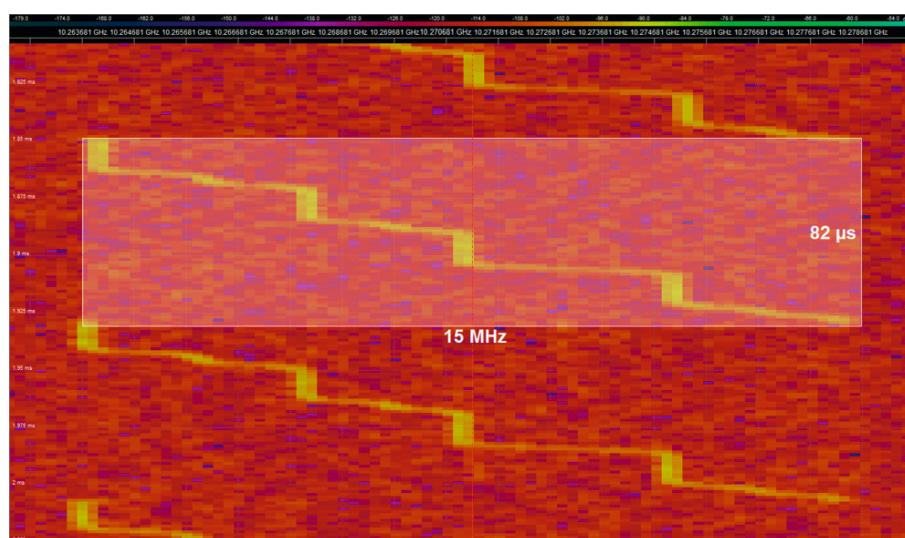
If continuous I/Q data is available, a spectrogram can be very useful to visualize low-powered signals or signals that are recorded from a very noisy environment. The spectrogram is especially suited to displaying this type of signal, as the signal bandwidth is divided into separate time/frequency regions (bins). The spectrogram plots the contents of each individual bin. If signal energy is present in a bin, it can be clearly seen, compared with a bin that has noise in it.

The spectrogram has the effect of distributing the noise throughout the bins and concentrating the signal energy.



Multifunction pulse video display: During PDW analysis, one or multiple PDW parameters can be displayed simultaneously as a function of time, enabling the user to analyze the scan characteristics and pulse sequence (interpulse analysis).

The radar displayed is a modern low-powered pulsed radar (RF: green; amplitude: yellow; PRT: red, this radar uses a complex stagger sequence; PD: blue, this radar uses a number of different pulse durations).



Modern stepped FMCW radar displayed in the R&S®TPA spectrogram: This signal had a sweep time of 82 μ s and a frequency shift of 15 MHz. Approximately six frequency steps can be seen in the waveform.

The collection system not only processes and displays PDWs. Since each pulse displayed in the PDW display has associated I/Q data, it is very easy for the operator to select pulses that have a high amplitude (and therefore the best quality) and analyze the individual pulses (intrapulse analysis).

The analysis software contains an application that is used by the operator to record all the measurements that are made on the radar signal. The radar profile describes the measured pulse data of the signal on a pulse-by-pulse basis. The radar profile is therefore a record of all the measurements that the operator makes on the signal of interest (SOI).

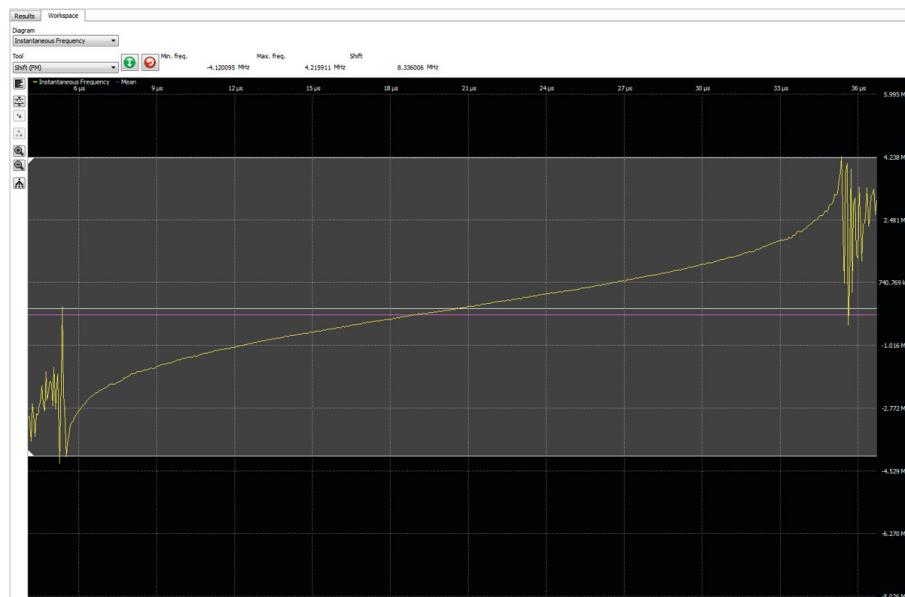
The R&S®TPA measurement tools are linked to the radar profile. So as soon as an operator measures any of the radar parameters, RF of a radar or the PRI or PD, for example, the data is transferred to the radar profile by clicking the appropriate transfer to radar profile buttons.

For each individual emitter that the operator collects and measures, a radar profile will be generated. The data contained in the radar profile describes a single emitter mode line and is referred to as an emitter descriptor word (EDW).

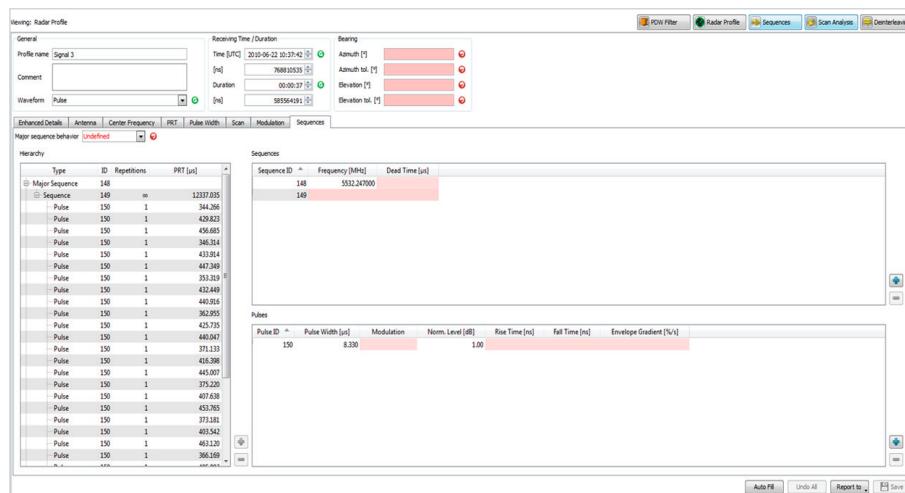
An EDW is therefore a formatted parametric summary of all the radar parameters contained in the collected data that the operator has manually measured.

R&S®TPA has two functions in the collection system. Its main function is to analyze the PDW/IQDWs produced in the R&S®WPU500 in almost realtime.

However, it also includes powerful pulse processing algorithms. The benefit of this is that continuous I/Q data from signals of interest that has been previously recorded onto the R&S®GX465 can, at a time more convenient to the operator, be processed by R&S®TPA and analyzed.



Typical time versus frequency display of a single frequency modulated pulse.



Radar profile application contained in R&S®TPA enables all the measured parameters to be accurately stored.

Integrated operator's radar database

The radar signal collection and analysis system contains an integrated operator's radar database (R&S®RA-DBRAD) and a suite of data presentation tools (R&S®RA-PS-RAD). They enable the operator to store, search, manipulate and display radar or mission-specific data.

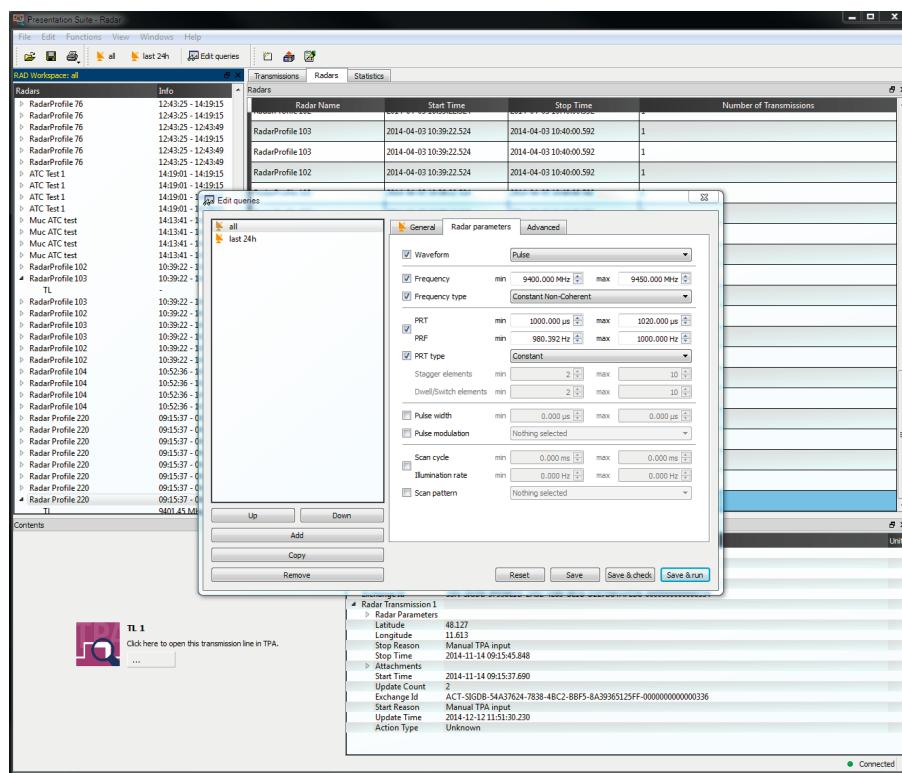
One of the R&S®RA-DBRAD functions is to store the EDWs that are transferred from R&S®TPA. These are stored in a chronological order. It therefore provides a reference to the operator for all the radar signals that have been collected and analyzed during the period of the mission.

R&S®RA-PS-RAD contains search tools that enable the operator to search through the stored EDWs. The results of the search are displayed as a list in a workspace. The results list contains the radar name and its associated parameters. The software is flexible and is designed to allow the operator to associate data entries or to move data between individual radar entries.

The links to the collected PDWs, IQDWs and continuous I/Q recordings are stored in R&S®RA-DBRAD along with the EDW. The R&S®RA-PS-RAD and the system software can be used to transfer collected PDW, IQDW and continuous I/Q recordings back into the R&S®TPA analysis software when further analysis of a signal is required.

If the EDW in R&S®RA-DBRAD contains a line of bearing to the target emitter, the track can be displayed on the R&S®MapView geographic information software. R&S®MapView displays the location of the receiver and the direction to the target emitter on a geographical background.

The R&S®RA-DBRAD also contains an integrated reference database. The reference database has an open interface that is designed to enable operators to import and export specific reference data if required.



R&S®RA-PS-RAD with the database query dialog: The results can be plotted on the mapping software contained in the system.

Highest data quality

PDWs, IQDWs and continuous I/Q data accurately visualize all radar and pulse parameters

Modern radar signals can be very complex. In some situations, every parameter transmitted by the radar can change on a pulse-to-pulse basis. To correctly characterize the more complex radar signals, the collection system must provide the operator and therefore the ELINT analyst with different recording formats that enable them to correctly classify and describe all types of radar signals, from the simplest pulsed radar to the complex waveforms that are produced by modern electronically scanning arrays. To support this requirement, the ELINT system produces three different data types.

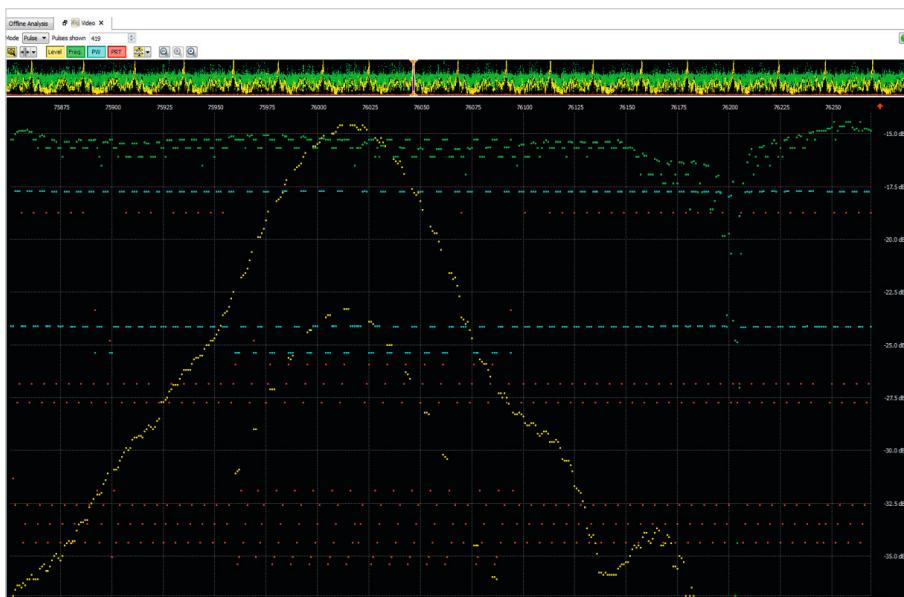
PDWs are the first data type the operator will use during signal collection. They are used to quickly classify the parameters of a pulsed radar. Each PDW contains time of arrival (TOA), pulse amplitude (level), RF and PD data.

Additional parameters in the PDW support the operator during signal collection and analysis, but for clarity they are not described in this brochure.

PDW files are small and therefore easy for the system to handle and give fast and accurate results. PDWs provide the operator with an effective means to analyze a long radar signal transmission.

Intrapulse data such as frequency and phase is discarded during PDW processing. So although PDWs are ideal to quickly visualize the operating mode of a radar, they are of limited value if in-depth pulse analysis is required or, in some instances, when the signal is very noisy or the operator needs to analyze a complex radar.

The diagram is a pulse video display that shows some of the PDW values from a main beam illumination of a circularly scanning radar.



When PDWs do not provide the required data, for example if the radar uses frequency or phase modulation on the pulse, then IQDW data is required.

IQDW data is digitally sampled data that is used to display the frequency and phase of the pulse.

During IQDW data production only the PD is digitized. The noise between pulses is discarded. IQDW data shows the operator a pulse that can be measured, making it possible to identify any intrapulse modulation present on the pulse.

IQDW data is required to analyze more complex radar signals or to analyze and accurately measure the frequency or phase modulation found inside longer PDs. It should be remembered that IQDW data contains the I and Q data from the pulse. So frequency and phase data has been preserved.

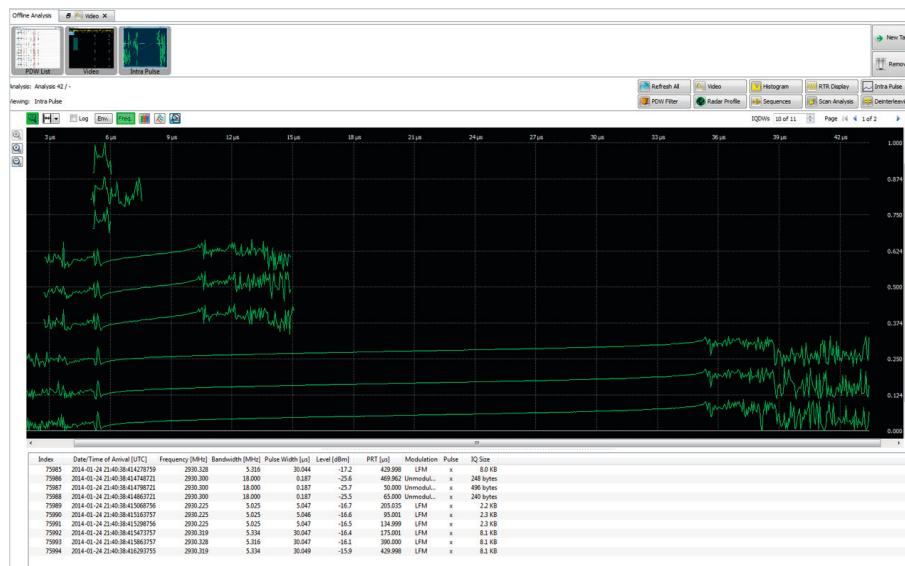
Continuous I/Q recordings are the largest data recordings produced by the ELINT system. Continuous I/Q files are large, since the required radar data is recorded along with the noise. Under normal circumstances, when operators make a narrowband recording they will make a continuous I/Q recording.

Complete digital design preserves the frequency and phase characteristics of the radar signals

The core of the radar signal collection and analysis system is the fully digital R&S®WPU500. Each R&S®WPU500 is a self-contained 4 HU collection and analysis system. It includes a wideband tuner, pulse detector and pulse analyzer.

The benefit of a fully digital collection system is that there is no loss in signal quality from the R&S®WPU500 to the analysis software. The digital data can be stored in the system and analyzed months later. When the data is analyzed it will be of the same quality as it was when it was collected. It will not degrade over time and can be reprocessed hundreds of times with no loss in signal quality, preserving the frequency and phase of the original signal.

IQDW data from a pulse sequence from a modern complex radar: The PRTs and PDs along with the pulse bandwidths are listed below the diagram of the pulses.



Digital I/Q recording provides lossless post-processing and high-quality results

Due to the complexity of modern radar waveforms, it may not be possible for the collector to fully characterize the radar parameters during the collection period. All modern radar collection systems must therefore include a long-term data storage solution. The R&S®GX465 I/Q recorder is used in the radar signal collection and analysis system.

The controls for the R&S®GX465 are integrated into R&S®WPU-CTL. As a result, all the devices in the system are controlled by one system software.

Continuous I/Q recordings are available up to a maximum bandwidth of 125 MHz. If the operator is required to make a recording, and the radar signal has a bandwidth larger than 125 MHz, an IQDW recording capability will automatically be made available to the operator.

The operator can record radar signals with a bandwidth larger than 125 MHz onto the R&S®GX465, since the noise between the pulses is removed in the IQDW production process.

This provides the operator with a number of benefits. It allows the recording of the I/Q data from wideband signals to be recorded onto a narrower band recorder. And since only the I and Q data of the transmitted pulse is recorded (the noise between the pulses is discarded), IQDW recordings are much smaller in size than an equivalent continuous I/Q recording. This is obviously a great advantage when a long recording is required.

This leads to another benefit: Signal processing time is greatly reduced. If a continuous I/Q recording is made, it must be processed before analysis. During I/Q processing, not only is the transmitted pulse data processed but also the noise between the pulses, which all takes time. However, IQDW data is preprocessed within the R&S®WPU500.

This means that noise between the pulses is discarded while the radar signal is being recorded. The benefit is that the time taken to display an IQDW recording is much shorter than the time taken to process a continuous I/Q recording.

From a form factor perspective, this means that the size of the recorder in the collection system can be reduced. This is important when the collection system needs to be transportable or mobile.

Integrated data management

The radar signal collection and analysis system has an integrated radar data management and transfer capability. The processes are fast and easy, saving the operator time during the collection period, since all the data files will be managed internally by the system software.

During the collection and analysis of a radar signal, the operator will measure the radar parameters and store the measurements in the radar profile within the R&S®TPA software.

The data management process begins after the operator has analyzed the radar signal and completed the EDW within the radar profile.

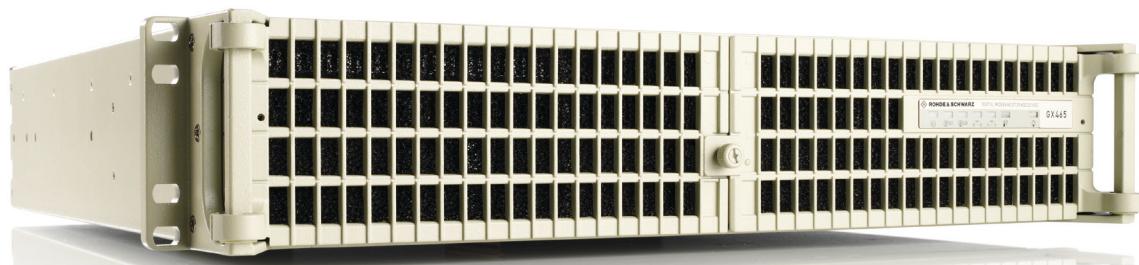
The next step is for the operator to transfer the EDW to the operator's database and to transfer the PDW/IQDW data collected from the R&S®WPU500 control and analysis software to the network attached storage (NAS).

The management of the data in the system is provided by the R&S®RAMON system software.

It moves the completed EDW from the R&S®TPA to the operator's database and stores the corresponding PDW/IQDW data to the NAS area.

Any continuous I/Q or IQDW recordings that are made will remain on the R&S®GX465.

R&S®GX465 digital wideband storage device.



The R&S®RAMON software provides the links to the associated PDW / IQDW / I/Q data, and the system software stores them with the EDW in the operator's database.

These processes are invisible to the operator and run in the background.

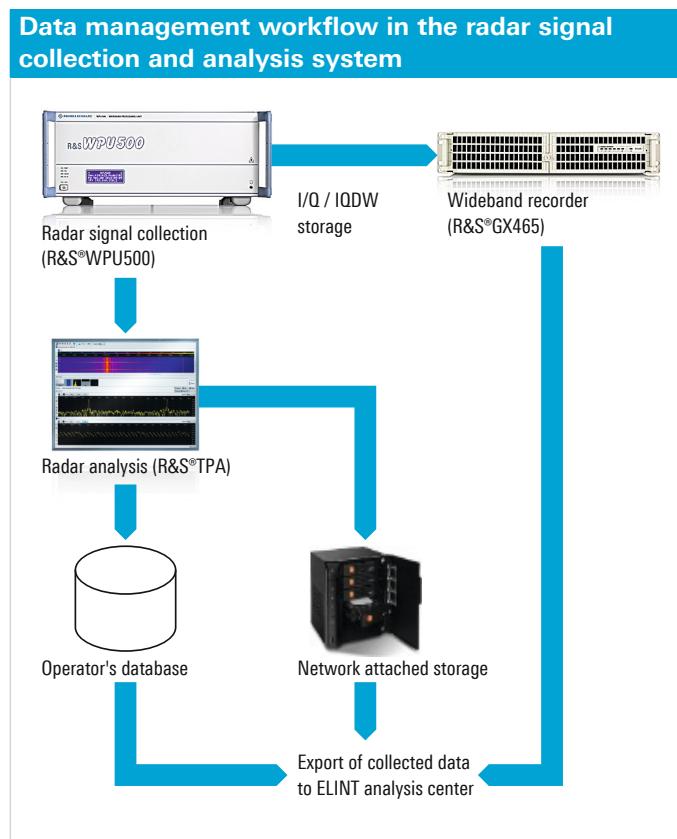
The system allows the operator to use the database query tool in R&S®RA-PS-RAD to search for specific parameters of the collected radar data.

R&S®RA-PS-RAD displays a summary of the results in a list. In addition, a detailed view of each EDW is displayed along with the measured data values.

As the links to the PDW/IQDW data are stored in the operator's database, it is possible to select the required EDW and load the PDW and IQDW files stored in the NAS back into the R&S®TPA software for further analysis.

The R&S®TPA software contains algorithms that process continuous I/Q recordings and produce PDW and IQDW data. This gives the operator the flexibility to be able to process any long continuous I/Q recordings made during a period of increased activity and analyze them at a later point in time.

On completion of the collection period, the collected data will be transported to an analysis center for further analysis. R&S®ReportEdit order and reporting software is used to move all the required data from the different storage locations to an external disk or a network for later in-depth analysis at a different location.



Future-ready system design

Fully digital collection and analysis system

The radar signal collection and analysis system is a modern, completely digital radar signal collection system. It uses state-of-the-art components and technology and therefore benefits from all the advantages of advanced digital signal processing techniques.

Single operator systems to nationwide integrated systems

The components are easy to configure and systems are therefore scalable. The modular design means that smaller single operator systems can be quickly deployed to areas of interest. The components can also be integrated into larger nationwide integrated systems.

As the system is designed to be flexible and scalable, it can be operated in all environments. This enables it to be scaled in response to expected peaks and troughs in the operational requirement.

Since the system uses state-of-the-art components, it meets current operational requirements. Plus, the company's approach to system development, engineering and product management ensures that any radar signal collection and analysis system will have a long operational life before it becomes obsolete and needs to be replaced. The radar signal collection and analysis system will benefit from continual upgrades and enhancements. This ensures that users will always have access to the most up-to-date solutions available.

Remote control of unmanned or detached receiver sites

The radar signal collection and analysis systems are network capable and are designed to be controlled remotely. This enables sensors to be located in remote locations, such as those found in mountainous regions, and collect high-quality data while being controlled from a central location.

Open interfaces

Rohde & Schwarz understands the complete radar electronic support measure (RESM) and ELINT operational environment and therefore the need for open interfaces. The data produced by the radar signal collection and analysis system can be converted into other data formats and used with other systems.

Low-risk turnkey solution

Tried and tested system from a single supplier

The radar signal collection and analysis system has been developed to be a complete commercial-off-the-shelf (COTS) solution that contains all the functionality required to complete any collection task in the modern radar world. It has been developed using a combination of both live and simulated radar environments.

As Rohde & Schwarz can offer a complete collection and analysis system, the software and hardware complement each other perfectly. The software has been developed to maximize the hardware features. The benefit to the customer of acquiring a complete system from a single supplier is that all the integration risk is removed from the customer and held by Rohde & Schwarz.

Integration into almost any type of platform

As the system is modular, designed to be scalable and can be remote controlled, almost any platform or any location can be fitted with the radar signal collection and analysis system.

Low integration costs

The radar signal collection and analysis system uses off-the-shelf components and proven system designs. Rohde & Schwarz also deploys dedicated radar signal collection and analysis development teams and dedicated project managers. This approach ensures that Rohde & Schwarz engineering, integration and project delivery teams understand both the system and operational requirements. Project teams are therefore very quickly able to focus on the customer project and mission aims. The benefit of this approach is that the need for a separate, and sometimes expensive, systems integrator is often eliminated, thereby lowering integration costs and increasing the speed and efficiency of project processes, which in turn leads to a system delivered on time and to budget.

Post-project support

Rohde & Schwarz recognizes the fact that ELINT can be a challenging field of operations. To support the customer, Rohde & Schwarz has an ELINT department. It is agile and able to respond quickly to customer requests and adapt to the customer's changing environment. Rohde & Schwarz experts are always available via e-mail, telephone or in person to address project needs.

Customer-specific integration

The Rohde & Schwarz ELINT and engineering teams have a great deal of experience in systems integration, project delivery and the modern operational environment. This knowledge enables the project teams to quickly understand customer requirements and therefore provide a specific solution, with realistic timelines that are tailored to the customer's requirements.

Operational and technical training

The radar signal collection and analysis system has been designed and developed by a team of developers and former operators. They offer the best combination of experience and innovation to ensure that radar signal collection and analysis system provides the best solutions to collect the pulsed, CW and complex signals that are present in the modern radar environment.

Rohde & Schwarz offers training and consultancy, which must maintain pace with current operational developments.

Rohde & Schwarz employs dedicated trainers who have years of experience as radar signal collectors and radar signal analysts. They are not only former operators and analysts but also qualified trainers with a deep understanding of radar operation and theory. They are able to handle classes whose participants range from young inexperienced personnel to senior managers or officers. Since the trainers have years of experience in different environments, they will quickly understand the customer's existing experience and requirements and will tailor the training to suit the level of knowledge within the class.

The courses offered by Rohde & Schwarz are modular and designed to provide students who have no previous experience in the radar world with basic radar theory and an understanding of radar functions. The training develops the skills needed to understand radars, how they operate and why they operate in the modes that they do, covering both radar signal collection and analysis. It contains modules on the radar measurable parameters and, for military customers, on how the ELINT operator or analyst can interpret the parameters.

Ordering information

Any ELINT system should be optimized for the environment in which it will have to operate.

Your local Rohde&Schwarz expert will help you determine the optimum solution for your requirements.
To find your nearest Rohde&Schwarz representative, visit www.sales.rohde-schwarz.com

Service that adds value

- | Worldwide
- | Local and personalized
- | Customized and flexible
- | Uncompromising quality
- | Long-term dependability

About Rohde & Schwarz

The Rohde & Schwarz electronics group is a leading supplier of solutions in the fields of test and measurement, broadcast and media, secure communications, cybersecurity, and radiomonitoring and radiolocation. Founded more than 80 years ago, this independent global company has an extensive sales network and is present in more than 70 countries. The company is headquartered in Munich, Germany.

Sustainable product design

- | Environmental compatibility and eco-footprint
- | Energy efficiency and low emissions
- | Longevity and optimized total cost of ownership

Certified Quality Management
ISO 9001

Certified Environmental Management
ISO 14001

Rohde & Schwarz GmbH & Co. KG

www.rohde-schwarz.com

Regional contact

- | Europe, Africa, Middle East | +49 89 4129 12345
customersupport@rohde-schwarz.com
- | North America | 1 888 TEST RSA (1 888 837 87 72)
customer.support@rsa.rohde-schwarz.com
- | Latin America | +1 410 910 79 88
customersupport.la@rohde-schwarz.com
- | Asia Pacific | +65 65 13 04 88
customersupport.asia@rohde-schwarz.com
- | China | +86 800 810 82 28 | +86 400 650 58 96
customersupport.china@rohde-schwarz.com

R&S® is a registered trademark of Rohde & Schwarz GmbH & Co. KG

Trade names are trademarks of the owners

PD 3607.1407.12 | Version 02.02 | April 2015 (sk)

Radar Signal Collection and Analysis System

Data without tolerance limits is not binding | Subject to change

© 2015 Rohde & Schwarz GmbH & Co. KG | 81671 Munich, Germany



3607140712