AWR Design

National Instruments

Magazine

New Era for AWR

Radio-Frequency Planning for Modern System Design

NI AWR Design Environment V11 - Focus on Productivity

Customer Success Stories

AWR Design Forum 2014

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AWR A National Instruments Company™

New Era for AWR

Change. What a word. The first thought we often have when we hear this word is, "Will this be good?" Why is that? Having worked in high-tech for my entire career, I have seen that change drives our industry. Change is necessary as technology marches on. Those that do not change and adapt to shifts in the technological landscape are often the ones left behind.

Change is underway at NI and AWR. As 2014 unfolds, you will see change take shape as we embrace our parent company's corporate name and officially become NI. Why? We have taken these past few years to learn about our respective businesses, meet and speak with mutual customers, and meld our strategies. We realize it is time for NI to take the spotlight in the microwave/RF marketplace as a major supplier of products, tools, and technologies. NI has broadened its offering of RF-centric tools over the past few years to span design software (in the case of the AWR acquisition) all the way through to high-frequency and high-speed test instrumentation (for example, PXI, the vector signal transceiver, and more).

Change will mean adopting a new corporate logo for AWR. Customers, partners, and employees will not see or feel any change other than this. The same great group of people you have come to know and respect will all be here to support you as our product line continues to grow and thrive as a mainstream design environment for the microwave engineering community.

What else is changing? The AWR software product portfolio is changing. With the release of V11 of our NI AWR Design Environment™, we incorporated big changes in the Analyst™ 3D finite element electromagnetic (EM) simulator. We included a ready-built 3D parts library of microwave connectors, packages, and more, so there is little need for a 3D editor, but we included one so you can create your own user-configurable 3D PCells. On the topic of EM, we also added HFSS to our design tools that plug in via our EM Socket™, so feel free to pull those HFSS projects into the mix as well.

We added many more enhancements, updates, and new features in V11. These changes all serve to make you, our customer, more productive. So join us as we embrace the changes that lie ahead!

Best regards,

Sherry Hess
VP Marketing, AWR Group
National Instruments

AWR Design Forum 2014

The AWR Design Forum (ADF) is an open event at which designers of microwave and RF circuits and systems such as monolithic microwave integrated circuits (MMICs), RF printed circuit boards (RF PCBs) and LTE communication systems can network, share useful information and resources pertinent to high-frequency design, and collaborate on industry issues and trends.

Highlights

- Technical presentations covering MMICs, RF PCBs, modules, and communication/radar systems
- Customer/keynote presentations from industry experts
- Live demo exhibition area featuring AWR, partners, and event sponsors

Locations

Asia

- Tokyo, Japan - July 11, 2014
- Beijing, China - September 22, 2014
- Xian, China - September 24, 2014
- Taipei, Taiwan - September 26, 2014
- Seoul, Korea - September 30, 2014

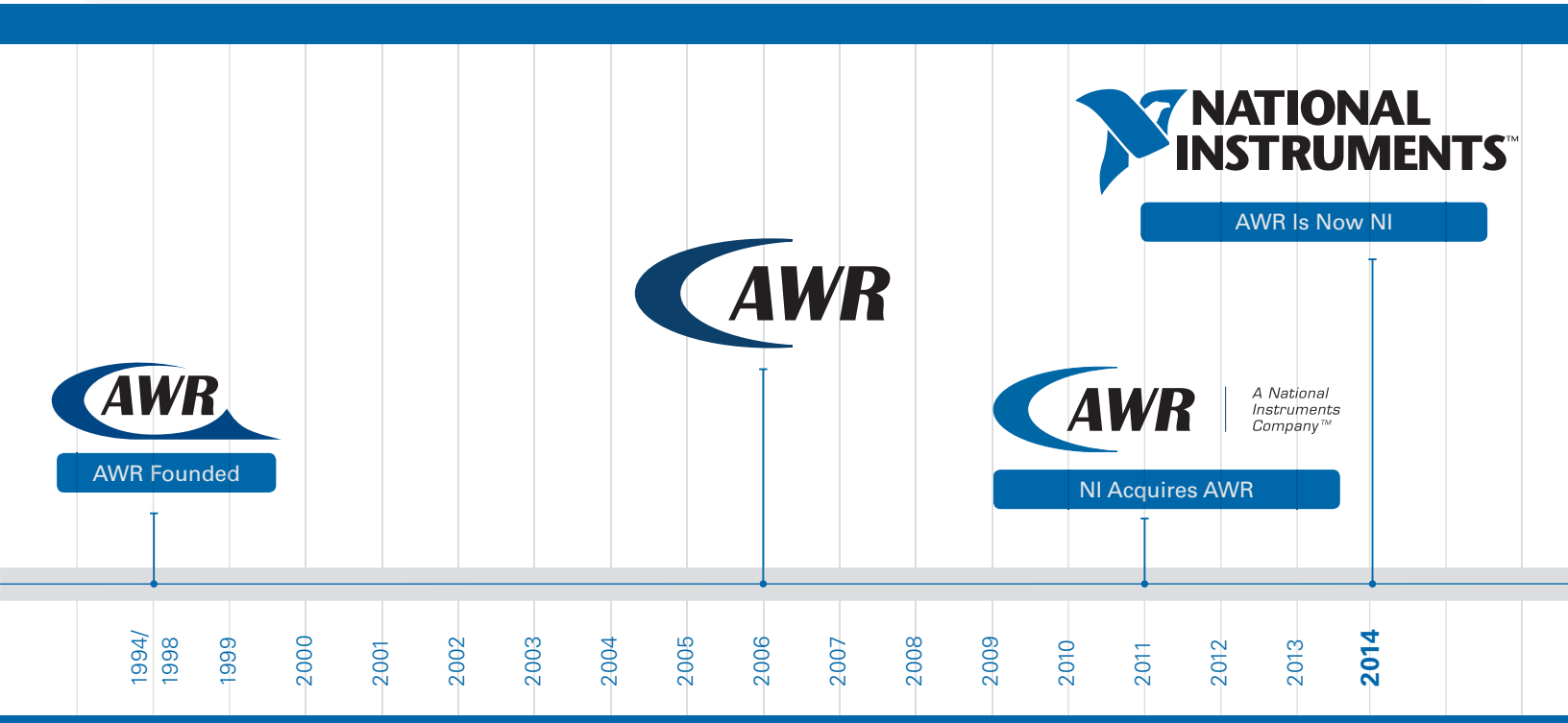
Europe

- Rome, Italy - October 8, 2014 (EuMW)

North America

- Locations and dates have not yet been announced

Visit www.awrcorp.com/ADF for up-to-date information regarding these events and to register.



Radio-Frequency Planning for Modern System Design

Radio-frequency planning (RFP), the process of assigning the frequencies, transmitter locations, and parameters within a wireless communications system, is an important element of system design. It ensures sufficient coverage and capacity for the services required by the end product.

The initial system definition for RFP is the input signal frequency/power specification and the output frequency/power specification. Because today's communications devices must be small and lightweight, provide superior performance, and be affordable, the goal of communications system is to transport the signal from the input port to the output port using the minimum number of frequency translations (along with the simplest synthesizer architecture) and the lowest-cost filter technology.

RF Planning

There are two aspects of frequency planning, a design methodology that uses so-called spur charts and related algorithms and a verification technique commonly known as spur searching. Traditionally, system designers have relied on the use of spreadsheets for RF planning purposes. AWR's RFP™ RF frequency-planning software utility automates and streamlines the design process while retaining the spreadsheet concept so that the designer is comfortable with a familiar paradigm.

RFP is seamlessly integrated as a wizard within AWR's Visual System Simulator™ (VSS) communications system design environment for the design of radio communications systems, cellular, or military radio links. RFP enables designers to effortlessly and efficiently determine spurious free bandwidths in RF/microwave designs and gives engineers a greater insight into unwanted signals or spurs generated in a specified bandwidth.

RFP is not limited to simply analyzing spurs generated by a lineup of mixers. The RFP RF link lineup can include most common components found in radio communication links such as amplifiers, mixers, and filters, and can be built up from a selection of commercially available parts or behavioral models. In addition, the number of conversions in the RF link is not limited to two, as is often the case with other RF planning tools.

Using Spur Charts in RFP

The RFP graphical interface provides several views of the system architecture and access to the setup and utilities. The main sections of the interface, as shown in Figure 1, are the System Diagram and the System Response.

The System Diagram consists of a cascade of system blocks (elements) such as mixers, filters, and amplifiers. Beneath these blocks the major parameters of the elements can be seen. These parameters can be locked, linked, or user edited.

Figure 1. RFP graphic interface with views of the system architecture and access to setup and utilities.

The System Response window can display the budget, the spur levels, and spot or wideband spectral plots.

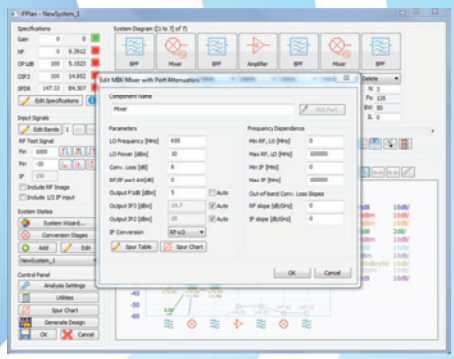


Figure 2. The System Diagram view shows the details of the selected element's performance, in this case a mixer.

By clicking on one of the mixers in the System Diagram view, the mixer performance can be examined in detail.

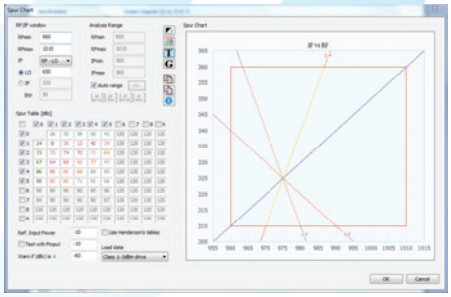


Figure 3. The Spur Chart displays a classic spur chart plot for the specific mixer and signal combination.

Clicking on the Spur Chart button displays a classic spur chart plot for the specific mixer and signal combination. This display will be familiar to designers who make use if the spreadsheet approach to mixer spur analysis. It uses the classic mixer equation: $\omega_{mix} = \pm n * \omega_{lo} \pm m * \omega_{rf}$

This equation defines both wanted and unwanted mixing products that are generated by the process of frequency translation using a mixer driven by a local oscillator. Colors are used to assist in understanding the spur levels in relationship to the specification. The mixer model can either be the classical model based on the Henderson tables or imported from a mixer vendor's specification. These spur tables can also be user defined, perhaps based on measurement or derived from a complete circuit-based model.

While spur charts of the form described above demonstrate the existence of spurs, some designers prefer to display the results using a spectral plot. In Figure 4 the spur equations are enhanced by accounting for the loss and filtering action of the input and output filters.

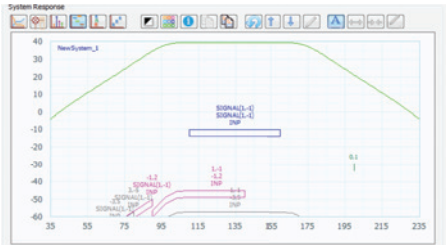


Figure 4. The spur equations are enhanced to add the loss and filtering action of the input and output filters.

The rectangles visible in Figure 4 define the wanted and unwanted responses (Figure 5). The annotation provides the heritage of the signal.

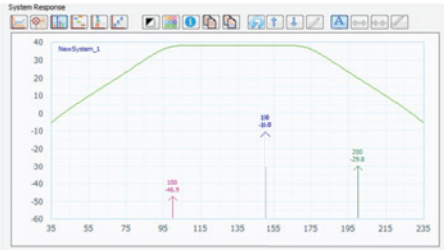


Figure 5. The wanted and unwanted responses can be defined by the rectangles.

A spot frequency spectrum is also provided. There are buttons available in the interface that allow quick changes to the signals to move them between band edges or place them at band center.

RFP enables complex signal environments to be constructed. Signals are classified as wanted and threats. Threat signals (friendly and unfriendly), a term often used by electronic countermeasure (ECM) designers, are color coded as red, while wanted signals are color coded as blue. The Input Signal Bands tool enables simple signal scenarios (a few signals) to complex signal scenarios (many signals) to be built.

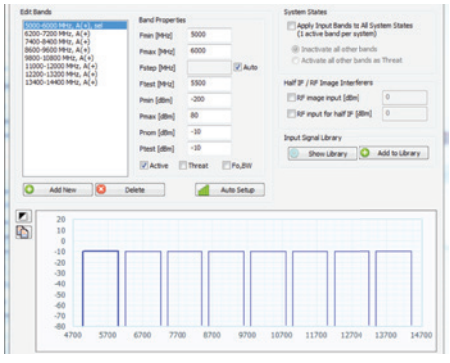


Figure 6. In this system the designer needs to select one of eight potential signals.

RFP allows local oscillators to track signals at a fixed offset. This permits a rapid assessment of spur creation at all LO states. For some systems, like ECM and surveillance receivers, a block converter is used, followed by a scanning LO. RFP also supports this architectural mode.

To complement the spur analysis, RFP provides an LO/IF search utility, which reports spur-free regions to assist with LO planning.

Another key utility that RFP offers is the ability to create a system solution with just the click of a few buttons! Systems can be designed by manually adding blocks or by using the Up/Downconverter Wizard (Figure 7) opened using the System Wizard button in the main window.

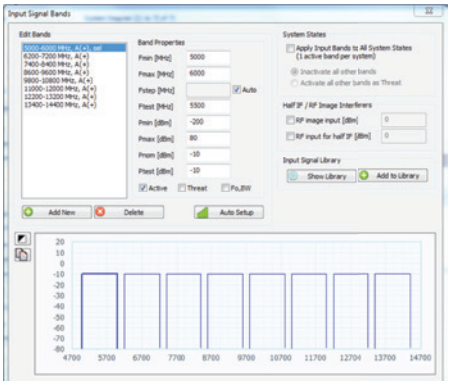


Figure 7. Systems can be designed by manually adding blocks or by using the Up/Downconverter Wizard.

Using this utility, a single, double, or triple converter can be defined. If required, the first filter in the RF chain can be a group filter that passes all the signals set up using the Input Signals window.

The choice of up or down conversion at each stage can be selected, as well as LO high side or LO low side, which avoids spectral inversion if that is important in the system. When the provisional system design is complete, the system can be exported to VSS for a more detailed budget and spur analysis. VSS can then be used to account for mismatch between components, account for noise at image frequency, and run yield analysis and optimization. Designers have a choice of signals and can perform error vector magnitude (EVM), adjacent channel power ratio (ACPR), and bit error rate (BER) measurements, among others.

Conclusion

The art of system design entails frequency planning, budget planning, and spur searching. AWR's RFP tool is a complete frequency planning tool that provides all three technologies—frequency planning, budget planning, and spur searching, all within the VSS system design software suite. RFP content is familiar to expert spreadsheet users, enabling seamless migration to a more comprehensive tool set. When using RFP as the initial tool for frequency planning in a communications system design flow, users can be confident that they have a reliable foundation for the overall design.

Contact your local AWR representative to request an evaluation of this new module or for pricing details.

Analyst V11 Offers Ready-Made and User-Customizable 3D Library of Parts

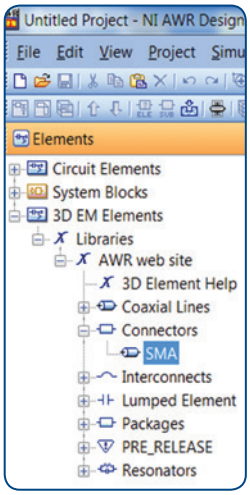
V11 Completes Analyst Integration into Microwave Office

The Analyst use model that's come to fruition within V11 NI AWR Design Environment sprang from the microwave/RF circuit design community's need for 3D EM simulation to be seamlessly integrated into a circuit simulator environment. Through a full and transparent integration, the tedium associated with the manual interaction and cumbersome duplication of efforts associated with disparate EM point tools being manipulated to fit within a circuit design flow/framework are eliminated.

Making Analyst as transparent as possible for microwave engineers to use in the design of circuits ranging from MMICs to MICs, RF PCBs, and microwave modules was the goal. In fact, any designer already familiar with AWR's AXIEM® 3D planar EM solver could likewise immediately access and use Analyst and readily grow more proficient after understanding a few additional boundary conditions and port setting options.

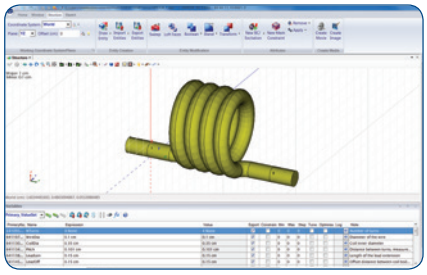
While the first release of Analyst addressed the user community's most common request for a seamless EM-circuit design flow that accounted for a select set of common 3D structures, the request for additional shapes and flexibility for users to readily customize their own parts library brought forth the PCell technology exploited within V11 Analyst.

Let's take an SMA connector for example. Not available in V10, V11's new ready-made/user-customizable library of parts addresses this. A designer can now either browse through the elements tab to locate the "Connectors" library within the 3D EM Elements tree or open a 3D layout editor and draw the required SMA connector as desired.



NI AWR Design Environment ready-made 3D parts libraries – SMA connector.

Since the 3D editor is tightly coupled to the Microwave Office® environment, all units and electromagnetic environment and material properties remain consistent. A key feature of this editor is the ability to use parameters to develop the drawing. These parameters can be exported to Microwave Office, and, since the user of the PCell can change the parameters, the resultant cell can be reused in a wide variety of cases.



3D layout editor.

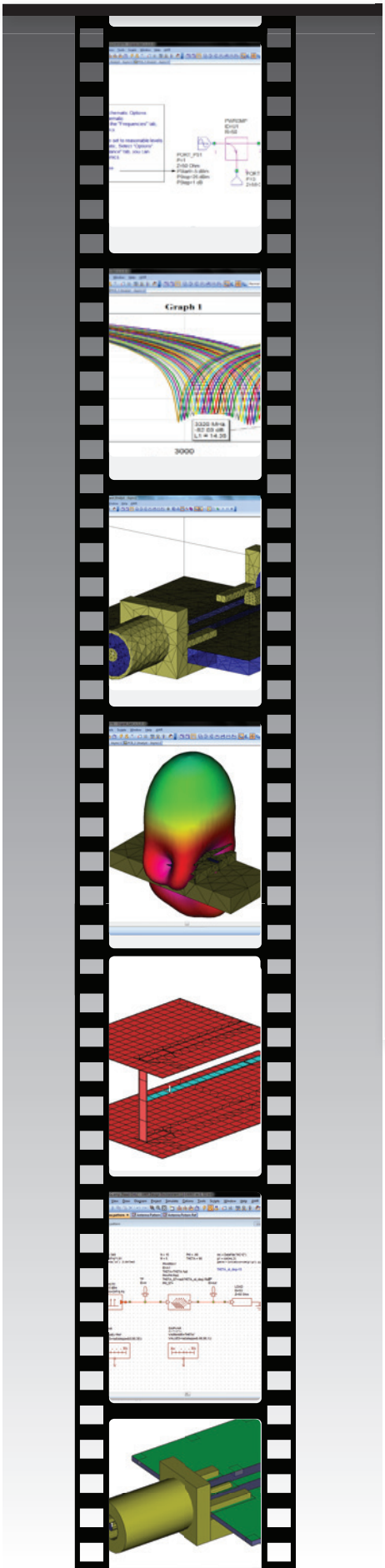
With AWR's new Analyst V11 release, designers can simulate arbitrary 3D structures from within the Microwave Office environment. Through the use of ready-made and user-configurable PCells, the microwave engineers have the power of 3D EM simulation without the distraction of having to work in an external tool disconnected from the main circuit simulation environment. Drawing time is reduced and possible set-up errors are eliminated. Powerful simulation concepts like parameter sweeping and model optimization are now easily accessed in V11 of the NI AWR Design Environment.

Learn more about V11 on line at www.awrcorp.com/whatsnew

"With AWR V11 release our emphasis is to empower customers to spend more time focused on their design challenges and less time on driving the software. AWR values customer feedback and many new V11 features are based on direct feedback we received from our customers via AWR's 'User Voice' program."

Ryan Welch
Vice President of Operations, AWR Group
National Instruments

Now Playing on AWR.TV™



NI AWR Design Environment New Feature Highlights

Microwave Office/ Analog Office

- Support for 64-bit mode on 64-bit operating systems
- New gamma probe model
- Layout improvements, specifically SPP (shape pre-processing)
- APLAC® harmonic balance (HB) as default HB simulator
- Graphic display enhancements:
  - Stepped colors on swept traces
  - Multi-selection of traces for edit
  - Markers now show parameter sweep value

Visual System Simulator

- Datasets for quick comparison of prior results
- New models:
  - Phased array block
  - WLAN 802.11ac library
  - Radar library (enhancements)
  - PID (proportional-integral-derivative) controller

Analyst

- 3D EM layout editor
  - Supports parameterization
  - Import SAT/IGES formats
  - User-customized 3D parts featuring PCell technology
- Ready-made library of 3D parts
  - Coils
  - Connectors
  - Antennas
  - And more
- Antenna analysis enhancement
- Visualization improvements

AXIEM

- Automatic ports technology
- AFS band limiting
- Simulation enhancements:
  - Higher accuracy loss model for thin conductors
  - Surface roughness
  - Frequency dependent dielectrics

Analyst, AWR's full 3D electromagnetic (EM) finite element method (FEM) simulator, now offers PCell technology, which makes it easy for designers to use 3D parts (ready-made and/or user-customizable) for such structures as bumps, bond wires, IC packages, coils and more. Once created, these parts can be deployed multiple times across multiple users, thereby ensuring maximum flexibility, engineering productivity, and reuse.

Customer Success Story

Prism Microwave Maximizes R&D Efficiency for Base Station Filter Design

The Design Challenge

Prism designs base station RF filters, specifically lightweight solution (LWS) filters, fixed, site-tuned, and remote-tuned multi-radio combiners (MRCs), as well as small cell filter solutions and lightweight mast head amplifiers. The company has stringent requirements for its RF/microwave design tools because of its commitment to rapid ramp-ups and very short time to market demands. Consequently, Prism's R&D organization has essentially no time for design (re)spins and validations of simulations versus measurements must be met quickly and accurately.

Prism's low-loss dual cross band combiner.

The Solution

AWR's Microwave Office® circuit design software is used for Prism's cavity filter tuning and optimization. It is also used to design Prism's active RF electronics and planar components on printed circuit boards (PCBs), including low-noise amplifiers (LNAs), drivers, power amplifiers (PAs), dividers, hybrids, attenuators, oscillators, and planar/discrete filters. Microwave Office is intuitive to use and enables Prism to achieve good circuit simulation accuracy and optimization, as well as good EM simulation for planar structures. Microwave Office also makes it possible for Prism designers to export planar structures in DXF format for layout compatibility with Mentor Graphics' PADS tool.

Request your trial copy today to see what AWR software can do for you?

"Microwave Office is intuitive to use. Its high quality simulation models enable us to achieve fast, accurate and optimized designs. AWR tools help us to achieve 'Smaller, Lighter and Smarter' products."

Mika Kuokkanen, Senior RF Engineer, Prism Microwave
www.prismrf.com

Why Did you Choose AWR?

Prism chose AWR's Microwave Office for its ease of use, productivity, availability of models, and easy integration with 3rd party tools, as well as excellent customer support. For Prism designers, the most positive feature in Microwave Office is its simulation accuracy across different models. The software's reliability and high accuracy means fewer design spins for Prism's design teams as well as simulations that agree well with measurements.

Microwave Office divider design: schematic, layout, and simulation results.

Cover Sistemi Uses AWR Software to Design a UWB Receiver From Concept to Final Production in a Single Pass

The Design Challenge

Cover Sistemi was awarded a project for the design of a complete RF ultra-wide band (UWB) receiver. Specifications were for a complete design starting from the antenna through to the entire RF/baseband analog chain down to the AD converter. It also included logic circuits for the receiver digital management. The project objective was to create a cost-effective receiver to be built using common off-the-shelf components on a six-layer printed circuit board (PCB) with a small 6cm x 6cm footprint. Strict sensitivity specification poses a major challenge for UWB receiver design, as very low-noise figure is required. The target sensitivity of this UWB receiver was -92dBm with pulses occupying greater than 1GHz bandwidth.

The Solution

Cover Sistemi designed the receiver from concept to final production with AWR software, using Microwave Office® for the circuit design and AXIEM® for the electromagnetic (EM) simulation. The scope of work included all design phases, from high-level simulation to circuit-level design and final verification of pre-layout and post-layout.

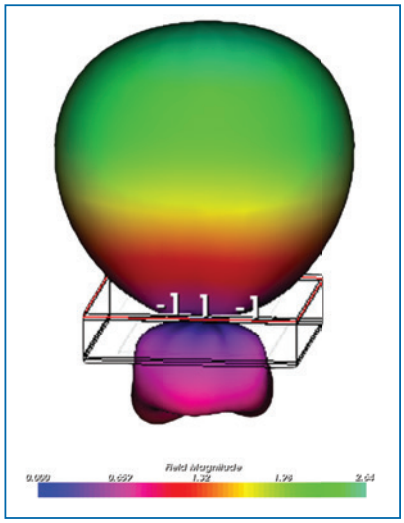
The UWB receiver included components such as antennas, filters, low-noise amplifiers, and mixers, all of which were built on a six-layer PCB. All component/design elements were first optimized for peak performance and then the entire design was validated with full-chain simulation using AWR's APLAC® multi-rate harmonic balance simulator (MRHB™). The UWB signal had a very large set of harmonics, which required a powerful HB simulation engine. Thanks to AWR's APLAC MRHB, the Cover Sistemi design team was able to validate the complete design using standard PC workstations.

First the design was simulated to ensure it matched the requirements. Next it was verified by design rule check (DRC) to check the design against the PCB supplier's rules, and by layout versus schematic (LVS) to ensure proper connectivity of each layer, vias, and device connections. Gerber and drill echelon files were sent to the PCB supplier for production.

At the final stage, Cover Sistemi used AWR scripting language to create a pick-and-place bill-of-materials (BOM) file for the assembly. This was critical as the design included over 500 components that could not be placed manually. The BOM file included all necessary information such as component IDs, coordinates, mounting layers, rotation, etc.

Why Did you Choose AWR?

AWR offered a complete package of technologies to enable Cover Sistemi to complete its end-to-end design with first-pass success. The system and RF measurements obtained were very close to AWR predicted simulation results. This, of course, is the added value of any EDA solution. The design team was also very pleased with the competitive pricing for the software's extensive technical capabilities. Cover Sistemi further noted that the AWR scripting editor was very easy and straightforward and there was no need for extensive knowledge of Visual Basic programming language. The software also offered a very nice visual representation of layouts and graphs. Finally, the team was pleased with AWR's extensive online help and documentation.



AXIEM radiation pattern of the antenna used in the UWB receiver.

"AWR was the backbone of our productivity. We were extremely satisfied with the quality of the models, fast simulation engines, and accurate simulation results. It is a complete tool that enables us to succeed from scratch to production designs and provides us with a superior platform for designing RF/microwave products."

Alessio Cacciatori, R&D - RF&MW Engineer, Cover Sistemi, www.coversistemi.com

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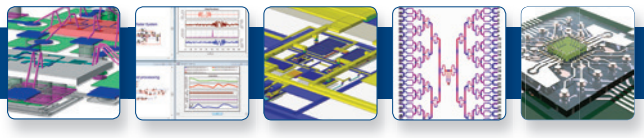
Ready to Use 3D Parts.

With Analyst ™ V11, we've done our homework so you don't have to. Simply pull from the ready-built 3D parts library of microwave connectors, coils, packages, antennas and more - or build your own via our user-configurable 3D PCells. Easy to create and even easier to use. 3D parts within your overall Microwave Office® design. Graduate to a higher level of design.

Grab a test copy at awrcorp.com/tryAWR.

IMS2014 - Tampa Bay, Florida

Visit AWR at IMS2014 - Booth #633



AWR Technical Resources

White Papers

- Modeling a Printed VHF Balun Leveraging EM Simulation Techniques
- EDA Software Design Flow Considerations for the RF/Microwave Module Designer
- RF/MWave EDA Software Design Flow Considerations for PA MMIC Design
- Understanding and Correctly Predicting Critical Metrics for Wireless RF Links
- VSS Co-simulates with NI's LabVIEW for Enhanced Signal Processing Capabilities
- Leverage Circuit Envelope Simulation to Improve 4G PA Performance
- Upfront RF Planning Speeds System-Level Analysis

Application Notes

- Using Visual System Simulator to Optimize SDR Performance
- Design of a Full ETSI E-band Circuit for a Millimeter-Wave Wireless System
- LTE Small Cell Base Station Antenna Matched for Maximum Efficiency
- End-to-end Design and Realization of an X-band Transmission Analyzer
- Design and Optimization of a Board-to-Chip Transition
- Multisim/Ultiboard for Low-Frequency Simulation and Layout
- Design of a Near Field Communication Antenna System
- Nonlinear Circuit Analysis in Time and Frequency-domain: A Pure LC Resonator
- Nonlinear Circuit Analysis in Time and Frequency-domain: Forced Van-der-Pol Oscillator

Webinars

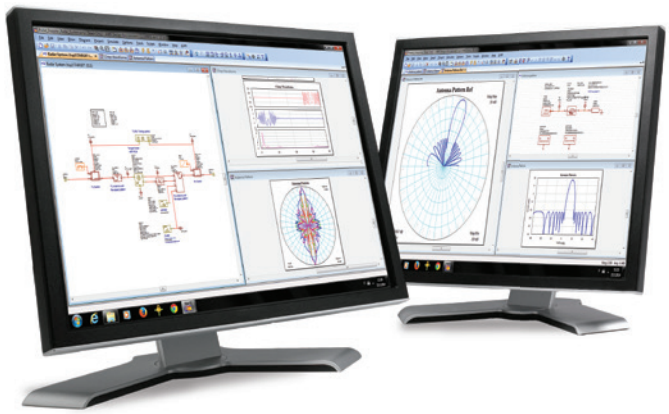
- AWR and Cardiff University: Recent Developments in Continuous Mode RF PA Design
- AWR and Cardiff University: An Introduction to Continuous Mode RF Power Amplifier Design
- AWR and PoweRFul Microwave: RF and Microwave Amplifier Power Added Efficiency, Fact and Fiction
- AWR and Besser Associates: RF and Microwave Filters
- AWR and Cree: Improving GaN HEMT PA Design with Cree's Large Signal Models and AWR's Microwave Office
- AWR and Cree: The Design of Class F, Inverse Class F and Continuous Class F PAs Using Cree GaN HEMTs and AWR's Microwave Office
- AWR and Lexiwave: Technical Insights and Design Techniques in RF PCB Design
- AWR and Lexiwave: RF PCB Design

Visit www.awrcorp.com/solutions/technical-papers for the latest AWR white papers, application notes and web events/archives.

Radar Design

AWR recently hosted a Technical Education Webinar with Microwave Journal titled, "***Design and Simulation of Modern Radar Systems***." This AWR webinar demonstrated how AWR's Visual System Simulator™ (VSS) with Radar Library enables designers of radar systems to account for radar signal generation, target, RCS, and clutter modeling, as well as signal processing. It also showed that AWR's VSS can be used to model the RF architecture of individual phased array elements as well as to characterize the entire phased array.

To view this webinar and learn more about AWR for Radar Design visit: www.awrcorp.com/radar



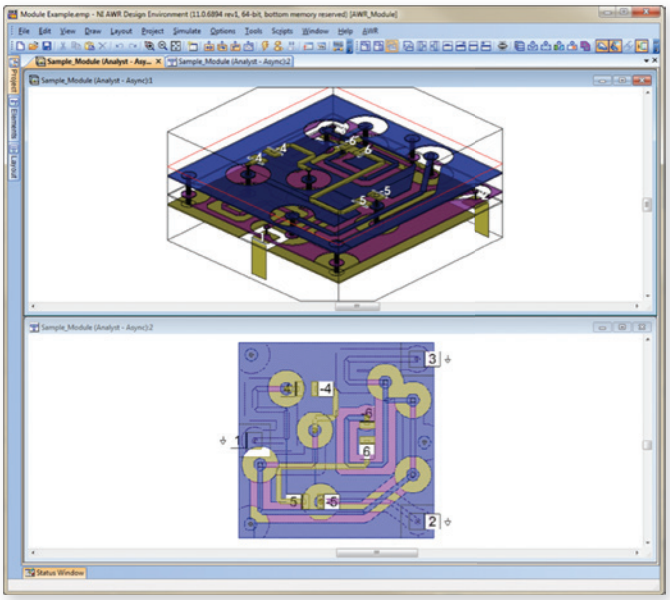
Uniting Design Flows: AWR & Ansys

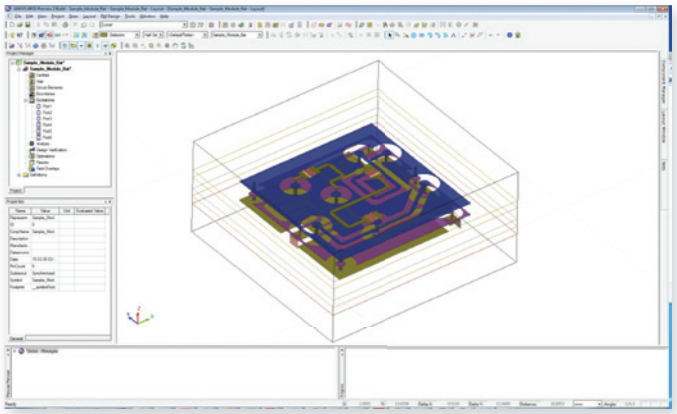
Uniting ANSYS® HFSS™ full-wave electromagnetic (EM) field simulation with NI AWR Design Environment/ Microwave Office, customers are now able to expand their design flows to more efficiently and accurately simulate their microwave circuits and bring better-performing products to market quicker.

With this design flow, Microwave Office users can readily access HFSS for analysis of EM fields and coupling of 3D structures like passive components, bumps, bond wires, and pins which are essential to successfully designing and realizing microwave circuits like monolithic microwave integrated circuits (MMICs), densely-populated RF circuit boards and multifunction modules.

In addition to enabling ANSYS HFSS 3D EM simulation capabilities from within Microwave Office, the connection allows the resulting 3D layered format exported from AWR software to connect to the ANSYS multiphysics portfolio. That suite includes ANSYS SIwave® for signal/power integrity analysis and ANSYS Icepak® for thermal characterization.

The link between these two powerful software tools is leveraged from AWR's innovative EM Socket open standard interface. This same socket architecture also allows AWR users to access 3rd party electromagnetic (EM) tools from firms like CST and Sonnet as well as AWR's own AXIEM 3D planar method of moments solver and Analyst™ 3D finite element method solver.





LTCC module design from Microwave Office (left) is transferred to Ansys HFFS (above) via EM Socket.

Expanding Design Flows: AWR Connected

The AWR Connected™ product family integrates NI AWR Design Environment with 3rd party software/hardware products to provide both broad and in-depth solutions for the design of high-frequency products. AWR Connected offerings span application areas such as PCBs, test & measurement (T&M), and MMIC thermal, as well as related synthesis technologies.

Cadence

AWR Connected for Cadence is an interface between Cadence's Allegro/MCM/SIP PCB and package layout tools and AWR's Microwave Office. It works by extracting user-specified data from Allegro — conductors, nets, components, pins, substrate, etc. — and producing an intermediate file that can then be quickly and easily imported into AWR's Microwave Office and AXIEM for electromagnetic simulation.

Mentor Graphics

AWR Connected for Mentor is a highly-efficient flow that achieves concurrency between Mentor Graphics Expedition and Microwave Office. This link allows collaborative RF PCB design using EM analysis, and circuit simulation with PCB library management, digital/analog mixed signal (AMS) implementation, and manufacturing verification and preparation.

Zuken

AWR Connected for Zuken offers PCB designers a seamless design flow that brings PCB or package layouts from Zuken's CR 8000 Design Force into AWR's Microwave Office and AXIEM for additional circuit-level and EM simulation.

AMPSA

AWR Connected for AMPSA provides synthesis solutions for impedance-matching networks and high dynamic range RF and microwave amplifiers. Integrating directly with Microwave Office software, migrating from synthesis through to non-linear harmonic balance simulation of amplifiers and related matching networks is straightforward and powerful.

Antenna Magus

AWR Connected for Antenna Magus improves the efficiency and effectiveness of antenna design. Antenna Magus provides a database of many different highly-characterized antenna types that can be exported to AWR software for EM analysis, integration, tuning, and optimization.

CapeSym

AWR Connected for CapeSym's SYMMIC is a bidirectional interface flow designed for MMIC designers who take AWR's Microwave Office designs into CapeSym's SYMMIC software package for thermal analysis.

Optenni Lab

AWR Connected for Optenni Lab provides an integrated workflow that enables optimized matching circuits to be transferred from Optenni Lab to Microwave Office with a single mouse click. Optenni Lab software enables matching circuits for antenna applications to be designed within seconds, starting from simulated or measured antenna impedance and the specifications of the operating frequencies.

Anritsu

AWR Connected for Anritsu links Anritsu's VSG/VSA instruments with AWR's Visual System Simulator software, enabling communication systems designers to drive the same digitally-modulated test signals (LTE, WiMAX, GSM/EDGE, etc.) in both Anritsu hardware and AWR's VSS.

National Instruments

AWR Connected for National Instruments provides a convenient plug-n-play interface to LabVIEW. This solution supports a broad range of signal processing and software-defined, virtual instrumentation control of NI test & measurement equipment for RF device testing and prototyping.

Rohde & Schwarz

AWR Connected for Rohde & Schwarz is a combined "hardware-in-the-loop" solution that integrates design and test domains for a wide range of communication standards. It connects AWR's Visual System Simulator and Rohde & Schwarz's test & measurement instruments.

Redefining RF and Microwave Instrumentation

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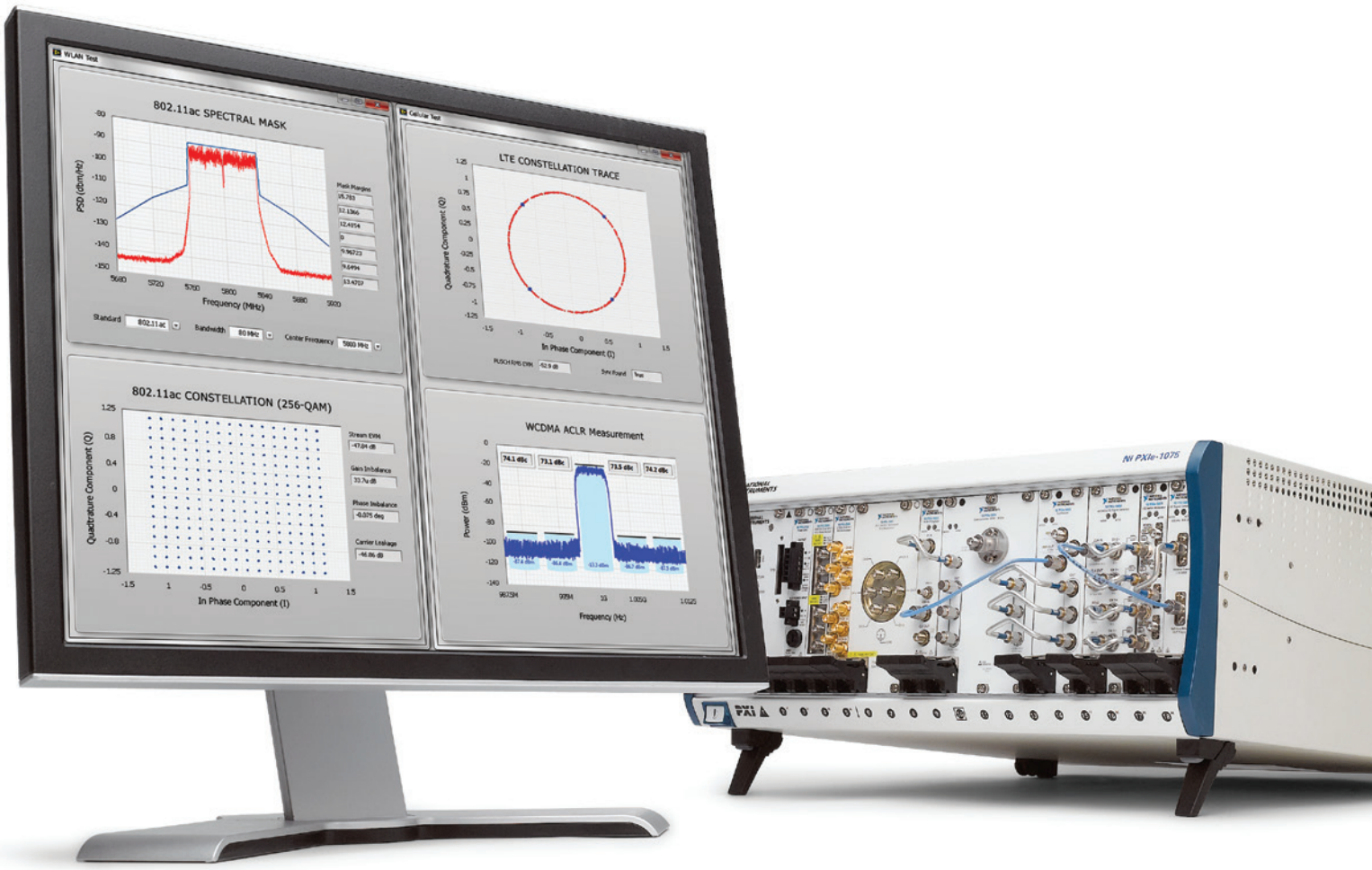

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Tokyo Keiki Cuts Design Time for High-Power Amplifiers in Half Using Microwave Office and AXIEM

The Design Challenge

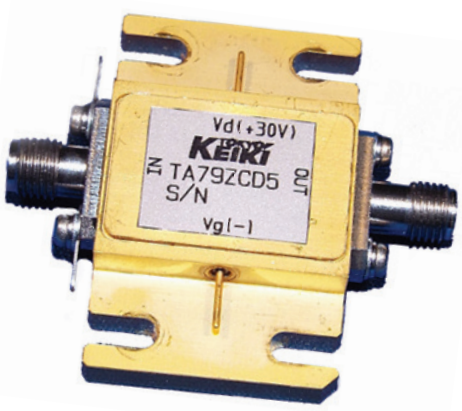
Tokyo Keiki's Yusuke Hamada designs X-band high-power amplifiers for radar applications. With extremely demanding deadlines and expectations for product excellence, reduction in design time, high-power characteristics, and miniaturization of device size are key and critical design challenges.

The Solution

To tackle these challenges, Tokyo Keiki relied on AWR's Microwave Office® circuit design software because it enabled seamless collaborative design of both the circuit and electromagnetic (EM) analyses using AWR's AXIEM® EM engine alongside and integrated within the Microwave Office environment. AWR's ease of use, simulation speed, and EM analysis accuracy enabled a nearly 50 percent reduction in GaN production time from design to prototypes.

"AWR software significantly reduced my design time, enabling me to achieve my design goal quickly and accurately. The time that I saved gave me the leeway to develop other products and try new ideas. Using AWR software, I was able to design something better with added value."

Yusuke Hamada, Assistant Manager, Tokyo Keiki, www.tokyokeiki-usa.com



Power Amplifier by Tokyo Keiki.

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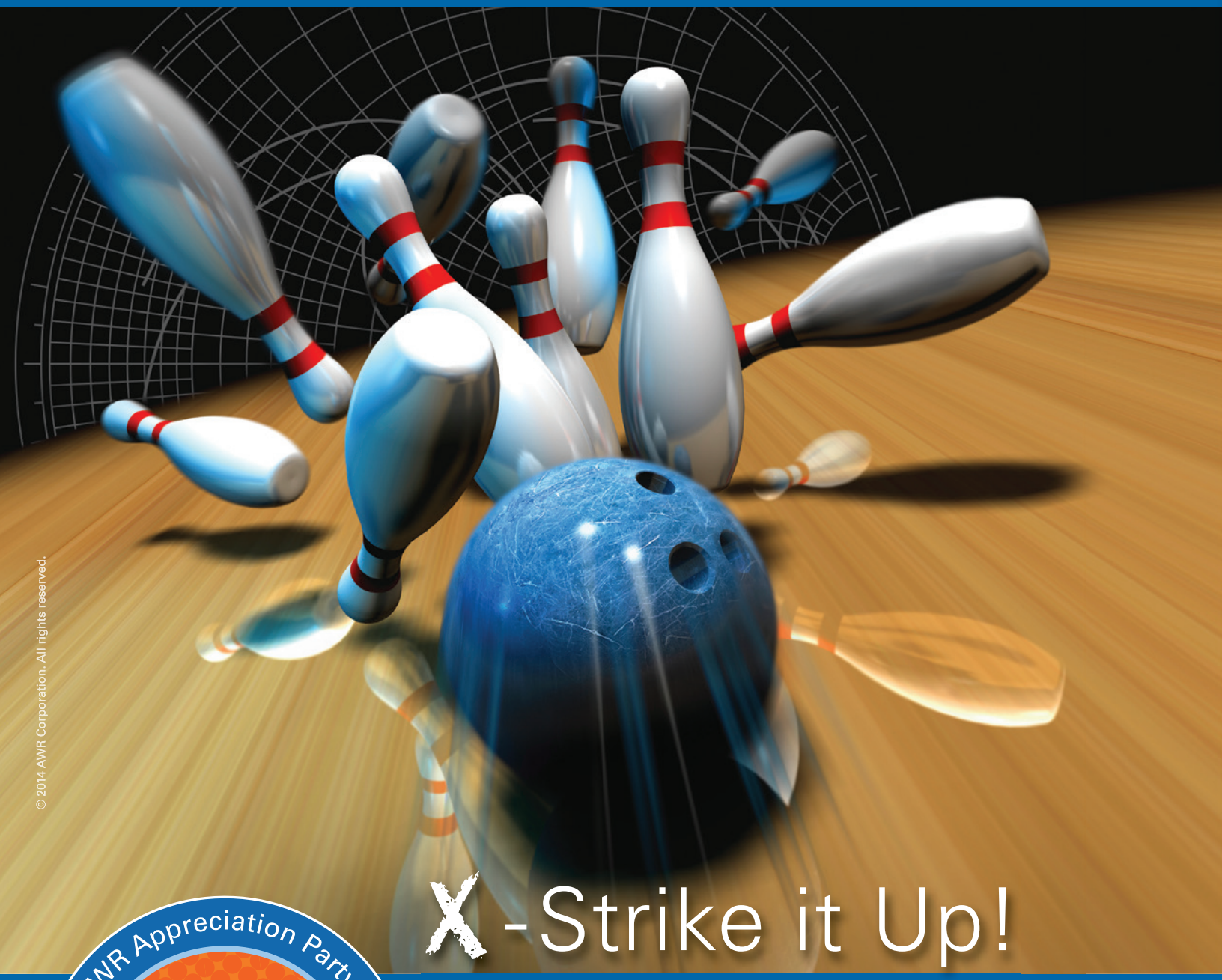

X-Strike it Up!

NI/AWR Appreciation Party

Location
Splitsville
Luxury Lanes
6.4.14

10TH ANNUAL

Strike it up and help us kick-off a new era for AWR as National Instruments. You'll find us in the NI booth **#633** showcasing our V11 NI AWR Design Environment™ release. Of special interest are Analyst™ 3D FEM EM demos showcasing user-configurable PCells (library of parts) and antenna measurement capabilities.

And, of course, be sure to join us at our 10th Annual Appreciation Event. Food, fun, drinks and high-scores assured…

Wednesday, June 4, 2014 | 7pm - Midnight
Splitsville Luxury Lanes | 615 Channelside Dr. #120, Tampa, FL 33602

Learn more at www.awrcorp.com/IMS2014.

IMS2014 - Tampa Bay, Florida

Visit NI/AWR at Booth #633