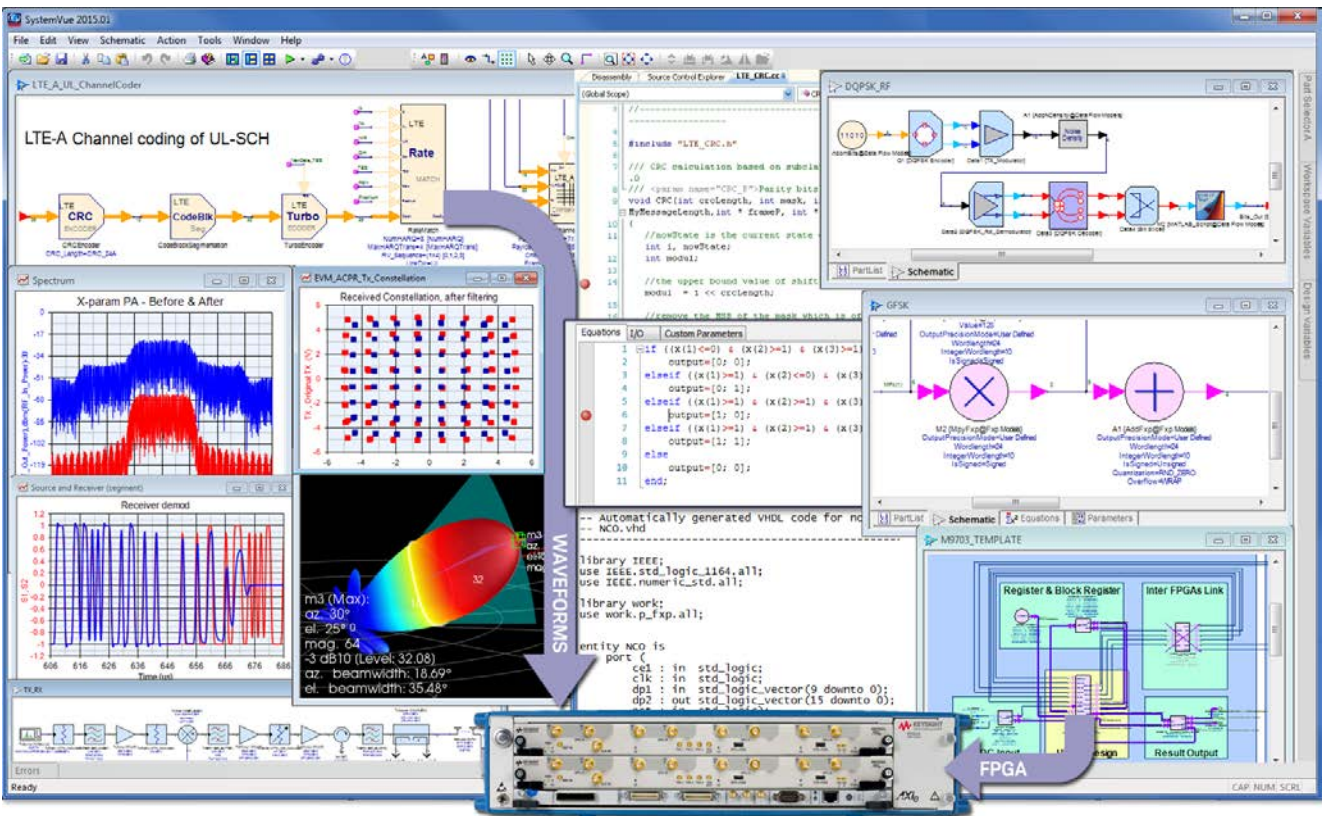


Keysight EEs of EDA

SystemVue Electronic System-Level (ESL) Design Software

Shortest path from imagination to verified hardware for physical layer systems design



Discovering SystemVue

SystemVue is a multi-domain modeling implementation and verification cockpit for electronic system-level (ESL) design. It allows system architects and algorithm developers to cross traditional Baseband and RF boundaries in order to innovate the physical layer (PHY) of next generation aerospace/defense and wireless communications systems. SystemVue simplifies tasks by integrating popular DSP modeling and implementation interfaces, along with accurate RF EDA tools, Standards/IP references, and Test and Measurement links into a single, highly productive environment. The result is that SystemVue “speaks RF,” links model-based design across important domains, and cuts PHY development and verification time in half.

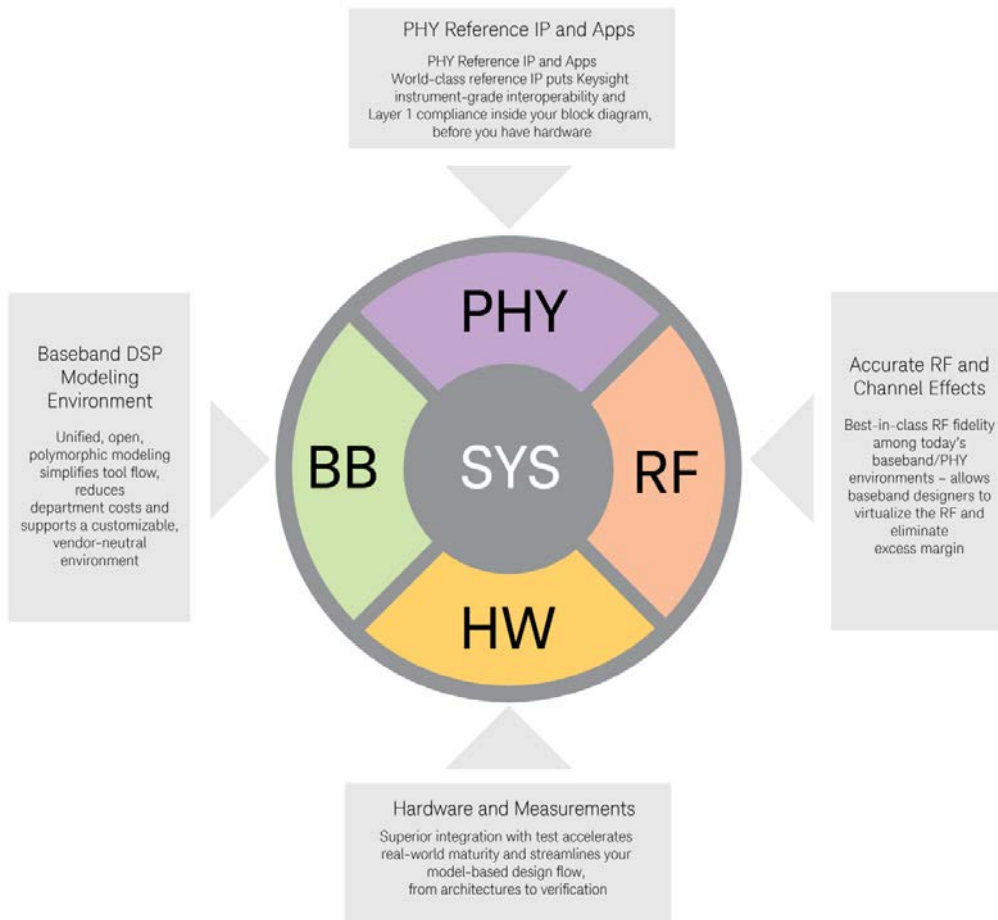


Figure 1. SystemVue provides a System-level Design Cockpit that unifies a nucleus of cross-domain capabilities into one environment.

Enabling Model Based Design Across Baseband and RF Domains

Wherever you are in the design flow

System Architects

- Simple and easy model based design workflow
- Multi-domain modeling for RF, baseband, and algorithms
- Fast link level analysis of Layer 1 systems

Baseband architects and algorithm developers

- Multi-language modeling
- Target neutral IP development
- Cross domain debugging of IP

RF system architects

- Accurate models and analysis in native Frequency domain
- Flow integrity with circuit level design (ADS)
- Integration with vector modulation analysis

Embedded FPGA and DSP HW designers

- Advanced analysis and heuristics for fixed point systems
- Link algorithms to HW in common formats
- Structured verification from design to implementation

System verifiers

- Use measurement-grade reference IP, or create custom signals
- Verify system block level interoperability at all levels of H/W abstraction
- IP aggregation, including both BB and RF systems

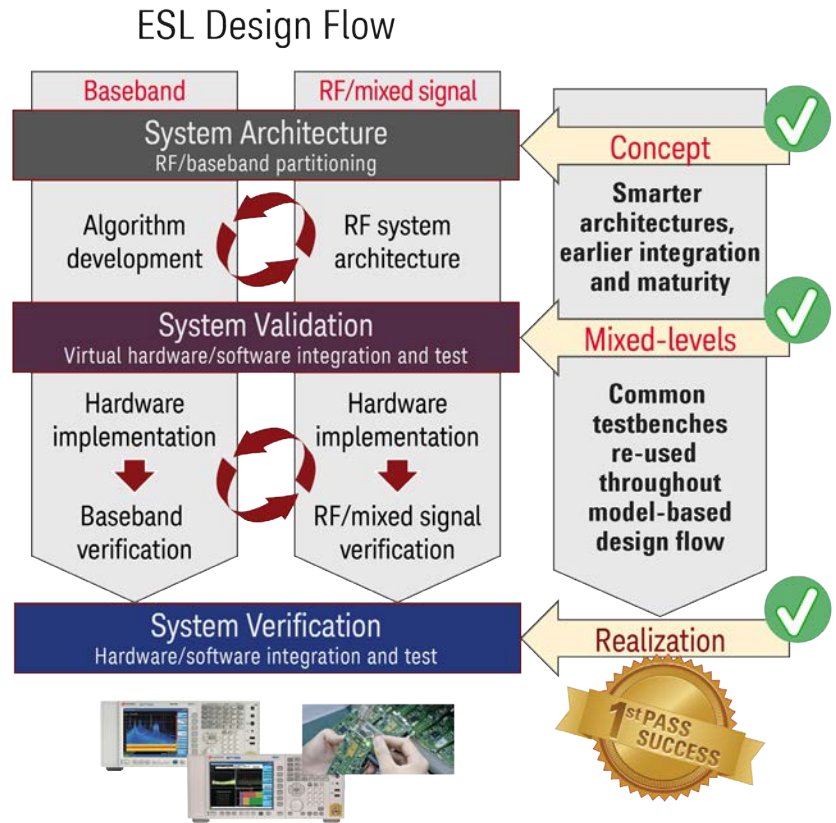
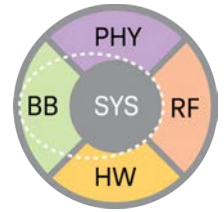


Figure 2. SystemVue provides a system-level approach that unifies the baseband and RF design flows.



Baseband Algorithms and Modeling

Design flow connectivity

Open modeling for easy IP integration

- Open modeling interfaces make it easy to adopt and re-use your IP
- Cross-domain debug and verification
- An integrated, tops-down design flow includes RF, Comms, and C++/HDL

SystemVue supports common modeling languages

- Connect to EDA design flows and virtual platforms through code-generation
- Direct integration of MATLAB

FPGA Hardware Design Flow

- Rapid Prototyping of system-level performance
- Fixed-Point Library for hardware-true effects at the system level, prior to targeting
- VHDL/Verilog code generation provides path to rapid prototyping and hardware

Accelerating realistic verification

- Attractive licensing from workgroups to whole enterprises, for IP and asset re-use
- Natural enterprise deployment of model libraries
- Validate SystemC and CatapultC communications PHY models

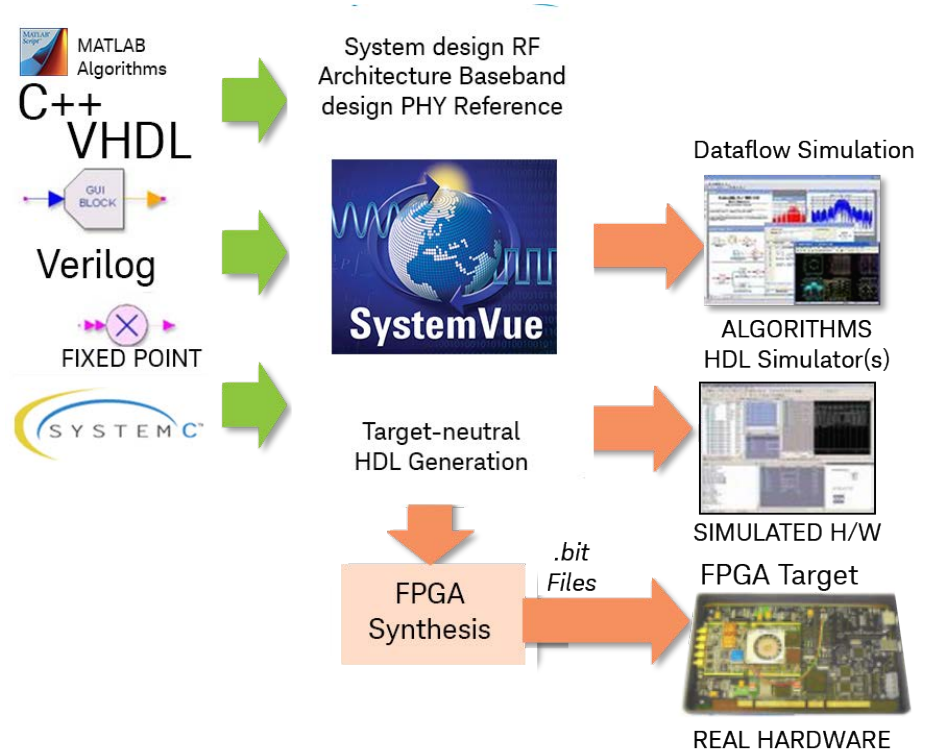
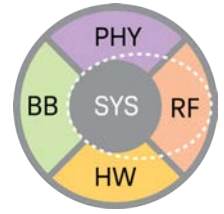


Figure 3. SystemVue provides an integrated, tops-down design flow for cross-domain model-based design.



Accurate RF and Channel Effects for System Architects

Accuracy enables insight

Virtualize the RF to include more RF effects

- Enjoy superior RF results with less detailed RF knowledge, and less RF flow integration
- Virtualize the RF, so that baseband tools can work smarter, faster, independent of RF flow complexity, but with greater confidence
- Dedicated RF system simulator, for RF-true architectures, X-parameters¹, spurs, analog effects

Connect with real RF design flows

- Close the modeling loop and unite design teams
- Direct links to RF H/W design flows in GoldenGate, ADS, including co-simulation
- Control link-level fidelity with faster, credible RF simulations

Create better baseband algorithms and system architectures

- More robust algorithms, through drive-test realism in the architecture phase
- Create and refine RF System Architectures, then use them in System-level Dataflow
- Accurate RF and channel capabilities enable link-level insights
- Informed RF-Baseband partitioning allows reduced design margins
- Include phased array antennas for 5G, radar and satellite RF system analysis

1. X-parameters is a registered trademark of Keysight Technologies.

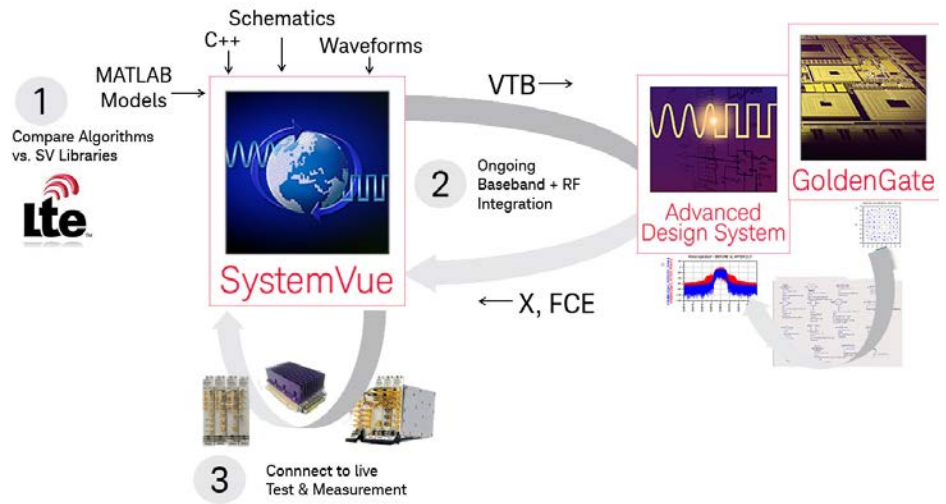


Figure 4. Verification Test Benches (VTB) provides system designers with three levels of consistent lifecycle validation – System-level architecture, Co-verification of working BB and RF, and Test and Measurement on working hardware.

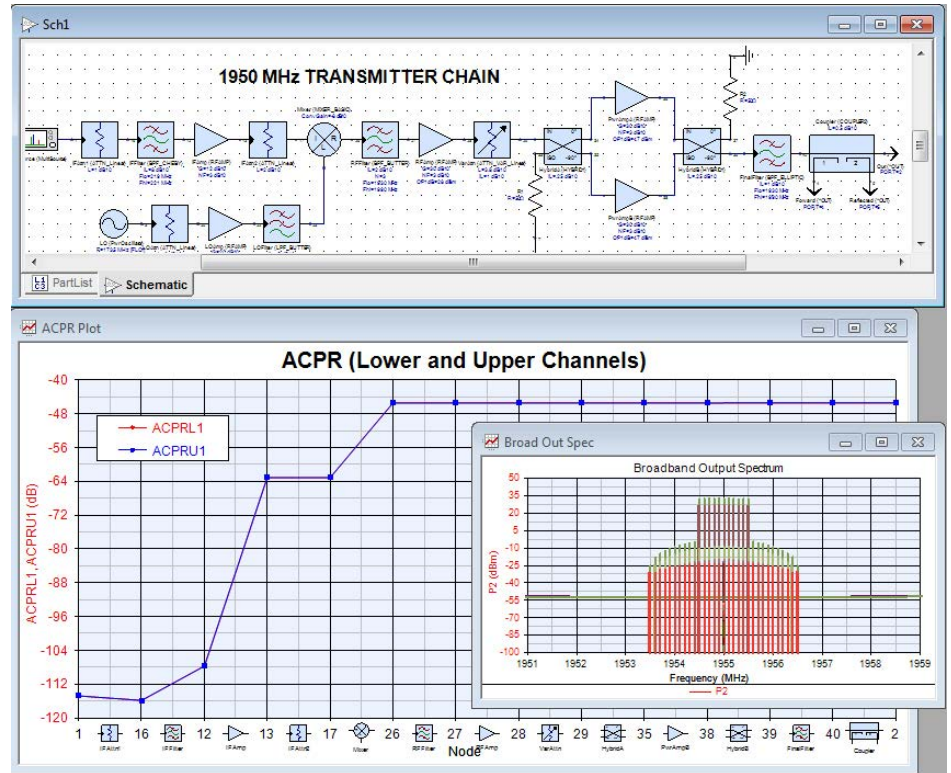
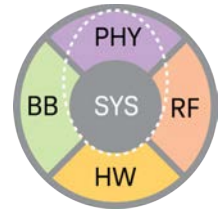


Figure 5. The RF System Design Kit combines the ease of spreadsheet-based modeling, the accuracy of a dedicated RF engine with X-parameter support, and the versatility of a real system-level design flow. (Above, modulated ACPR performance vs. each cascaded component is shown using the traditional “budget” analysis format.)



Physical Layer (PHY) Reference IP and Applications

Accelerate PHY design with a superior modeling environment

Instrument grade reference IP

- Save time with Keysight Technologies, Inc. trusted, independent IP reference
- Verify algorithms, create virtual systems, interact with test equipment
- Re-use the same Keysight IP and test assets throughout design

Confidence in Layer 1 Standards pre-compliance at an early stage

- Bring the real world into your creative process
- Reduce project risk by validating baseband and RF integration early
- Fill critical gaps, such as missing components and MIMO effects, using simulation
- Deeper R&D insight, before hardware prototypes
- Interoperate with test equipment even while Standards evolve

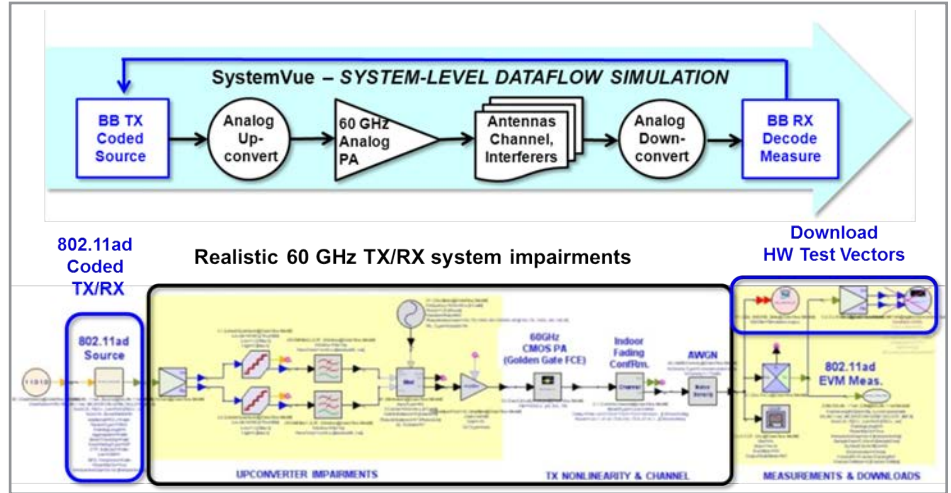


Figure 6. SystemVue’s flexible PHY-level system design and verification allows you to model the entire baseband and RF system with impairments and coded BER.

SystemVue baseband verification libraries

Streamline and automate functional verification

- Minimize effort with pre-built test benches and a consistent approach between design and test
- Instrument-grade functional pre-compliance for algorithms/links
- Model entire baseband and RF system with impairments, coded BER

3G/4G/5G MOBILITY	NETWORKING
5G and LTE-A (Rel 10+), LTE (Rel 8,9), WCDMA, HSPA+, CDMA, CDMA2000, GSM, EDGE	WiMAX / 802.15e WLAN / 802.11abgn/ac/ah 60GHz 802.11ad Custom OFDM [^]
LOCAL CONNECTIVITY	BROADCAST & SATCOMM
WPAN / 802.15.3c 802.11ad Zigbee [^] / 802.15.4 Bluetooth	DVB-S2/S2X, ISDB-T DOCSIS, OFDM General Digital Modem GNSS sat nav
[^] available with W1461BP core environment	DEFENSE
	RADAR: PD, UWB, FMCW, SAR, DAR, SFR, MIMO, Phased Array

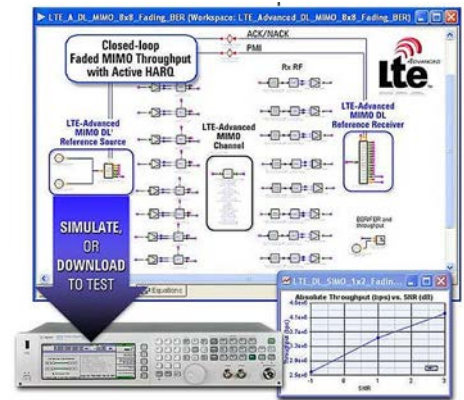
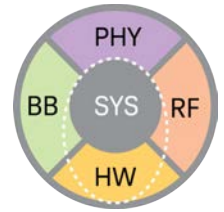


Figure 7. Use as algorithmic references in simulation, or with T&M.



Integrated Design and Test

Bring the real-world into design

Integrate measured data with algorithms

- Continue model-based verification from software into the real world
- Perform earlier physical layer fcn verification
- Simulate missing pieces so you can complete a virtual system earlier
- Virtualize MIMO and multi-channel/beam forming applications

Easy connection to test equipment

- TCP/IP instrument connectivity
- Streamlined support for many Keysight instrument families
- SCPI/IVI interfaces for additional instruments
- Scriptable MATLAB and command line interfaces
- Native integration with:
 - I/O Libraries, Command expert (Free)
 - N1010 FlexDCA Express (Free)
 - 89600 VSA
 - Signal studio (Option 7NP/7FP)
 - Aggressive support of new Keysight T&M families
 - Flexible file I/O and file compatibility
 - Custom signal generation and analysis

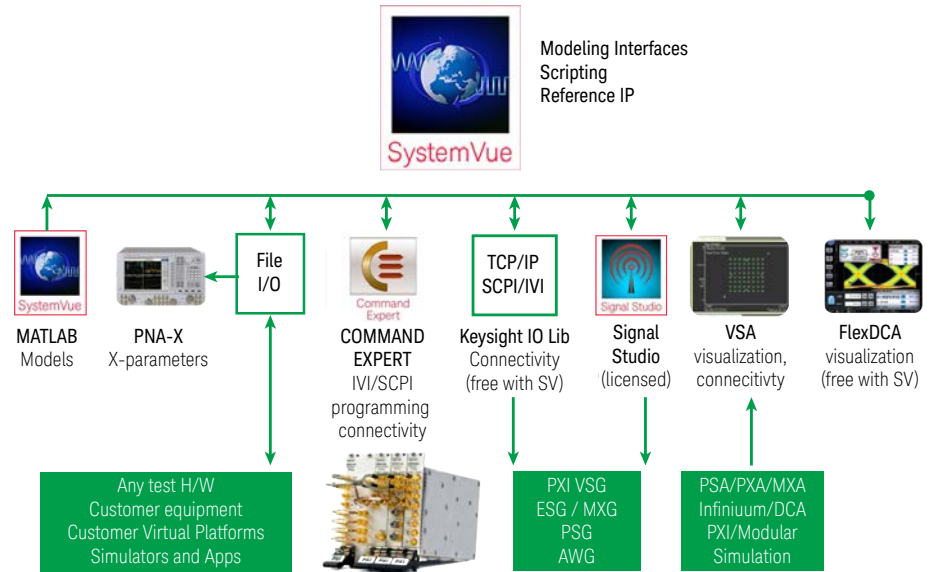


Figure 8. SystemVue offers streamlined support for many Keysight instrument families and native integration with Keysight software platforms.

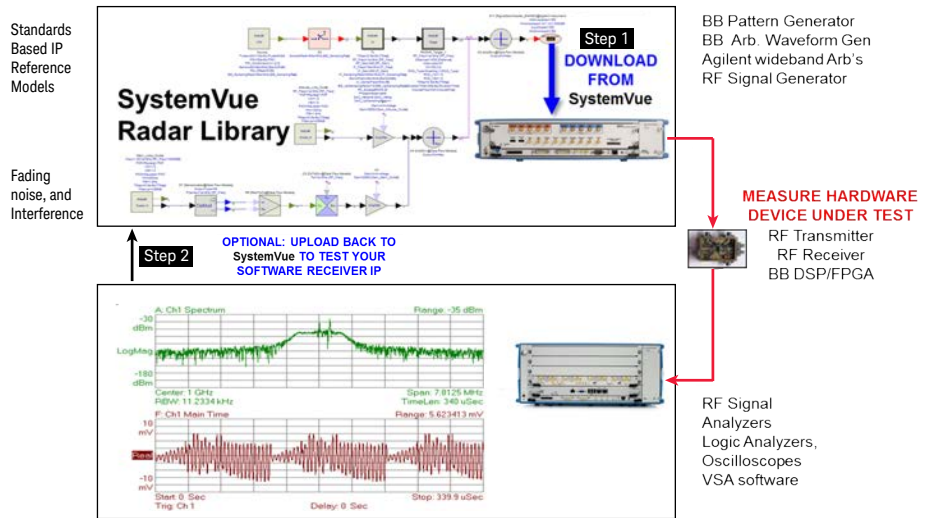


Figure 9. SystemVue's integrated test solution capability lets you continue model-based verification from software into the real world.

Aerospace/Defense

Confident Proposals, Faster Deployment, Easier Scenario Modeling



A Cockpit for cross-domain system design

Superior simulation, RF modeling technology

- Dataflow simulation offers faster radar signal processing than control-loop simulators
- Spectrasys RF block-level simulation provides a dedicated RF spectral-domain simulator (not a dataflow personality)
- Essential for high-performance wideband system architectures

Lower verification costs and higher asset re-use

- Radar reference IP and EW analysis templates save time and reduce NRE - no need to invent everything from scratch
- Integration with leading EDA design flows simplifies system design
- Top-down/bottom-up model-based design flow
- Lower project risk, plus deeper troubleshooting insights

Higher workgroup productivity

- Earliest possible baseband/RF integration for reduced design iterations and faster deployment
- Validate using simulation and hardware assets to complete/virtualize missing system components
- Maintain a system-level view at all times, even if you just provide one of the components
- Connect to test instruments and save NRE with reconfigurable test assets

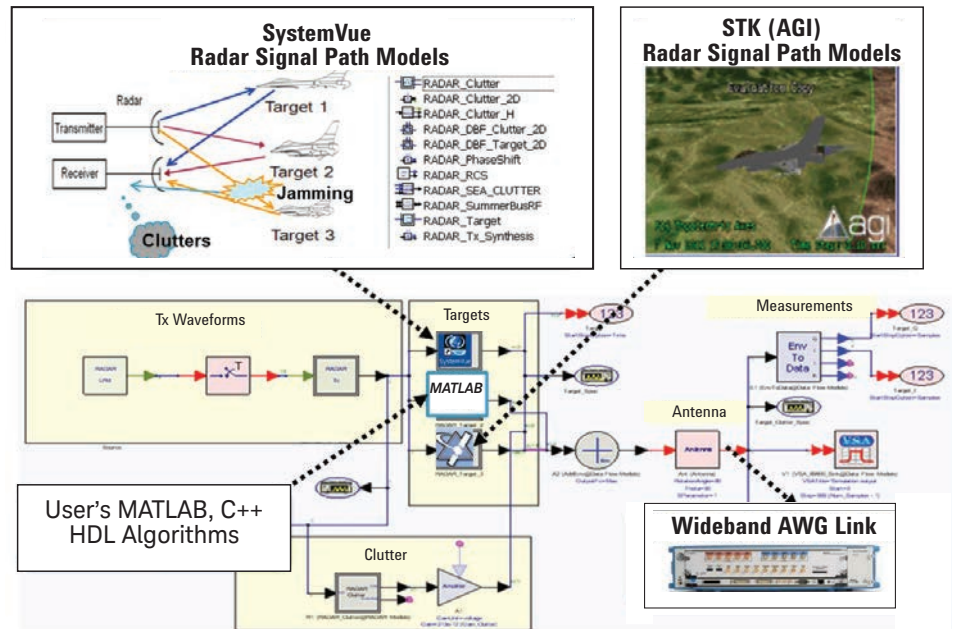


Figure 10. SystemVue allows the creative modeling of a radar system from transmitter to receiver including jamming, added clutter and virtual EW scenarios.

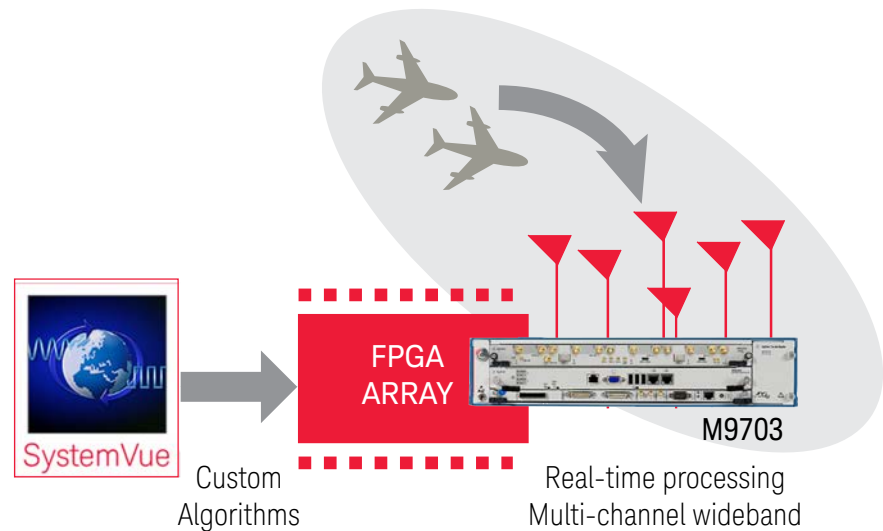


Figure 11. SystemVue programs FPGA s inside Keysight instruments for custom, real-time applications such as beamforming, EW, and radar.

Emerging Comms PHY

Accelerate Development, Reduce Inefficient Margins, Deliver More Robust Designs



Achieve first pass success

Today's requirements

- Wide bandwidth
- High dynamic range
- Multiple microwave carrier bands
- Multiple channels, with MIMO, beamforming, and phased arrays
- Complex interference and fading environments
- Backwards-compatibility with legacy standards
- Advanced DSP and RF architectures
- Ability to track evolving research and standards bodies

Single modeling cockpit connects to best-in-class capabilities

- Open baseband modeling in multiple languages
- RF accuracy, with links to leading RF EDA flows
- High-performance test equipment
- Standards-compliant references

Flexible algorithmic references

- Digital modem and OFDM resources
- MIMO channel modeling, including 4G MIMO OTA WINNER-II
- DPD and CFR references
- Radar, phased array, and beamforming reference
- 5G exploration

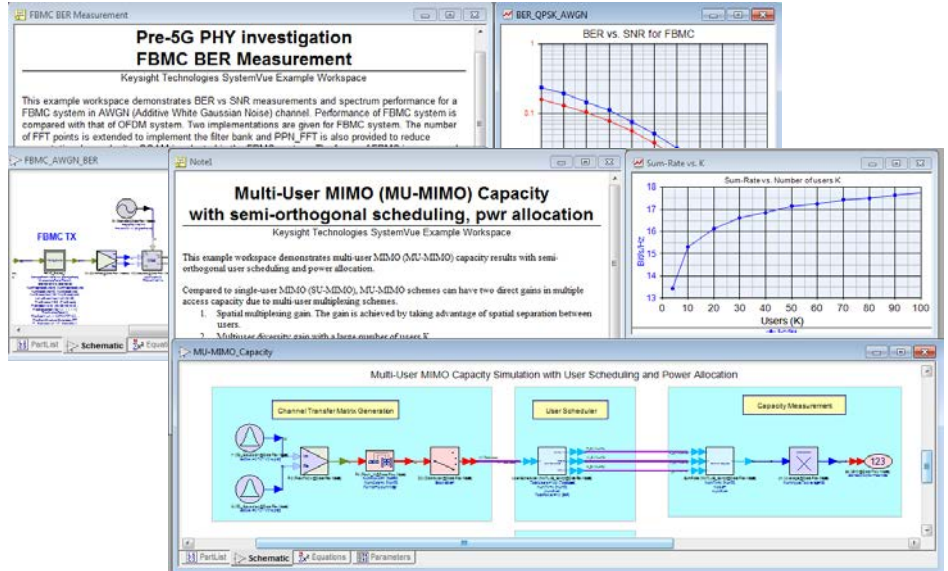
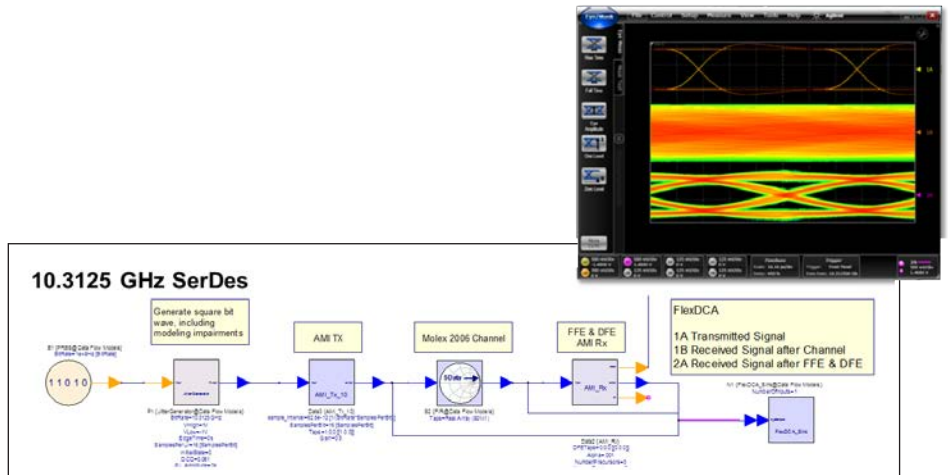


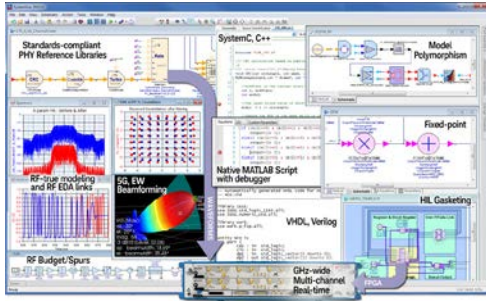
Figure 12. The rich capabilities for baseband and RF modeling make SystemVue an ideal platform for 5G architecture development and validation with measurements.

Model and generate transportable IBIS AMI SerDes models

- Model gigabit SerDes architectures, either backplanes or optical interconnects
- Generate transportable IBIS AMI 5.1 standard models for SI channel simulators
- Simulate directly into the Keysight FlexDCA measurement personalities



SystemVue Product Structure and Options Summary



W1461 SystemVue Comms Architect

Core system-level simulation environment with native MATLAB Script, 100s of models, and links to T&M.

Design flows and applications

- W1711 SystemVue engine
- W1712 distributed computing 8-pack
- W1714 AMI model generation
- W1715 MIMO channel builder
- W1716 DPD builder
- W1717 hardware design kit
- W1718 C++ Code generator
- W1719 RF system design kit
- W1720 phased array kit

Baseband exploration libraries

- W1912BEL SystemVue BEL (Various standards available)
- W1906BEL 5G modem BEL

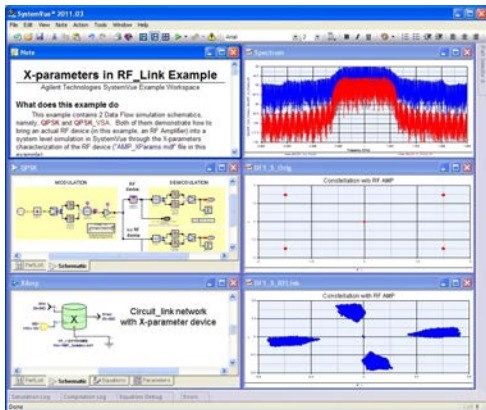
Libraries and model sets

- W1713 SerDes
- W1902 digital modem
- W1904 adaptive EQ
- W1905 radar
- W1906 5G
- W1908 Automotive Radar
- W1910 LTE
- W1911 WiMAX
- W1914 DVB-x2
- W1915 mmWave WPAN
- W1916 3G
- W1917 WLAN
- W1918 LTE-Advanced
- W1919 GNSS



W1462 SystemVue FPGA architect

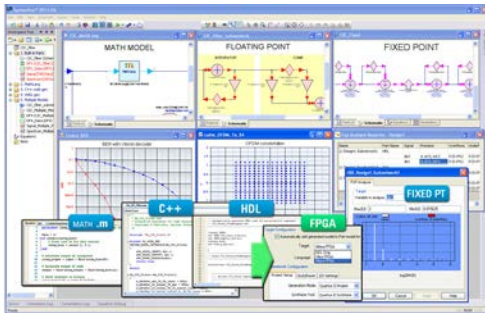
Adds Fixed-point hardware-true simulation models and a VHDL/Verilog hardware implementation path for the SystemVue environment.



W1464 SystemVue RF system architect

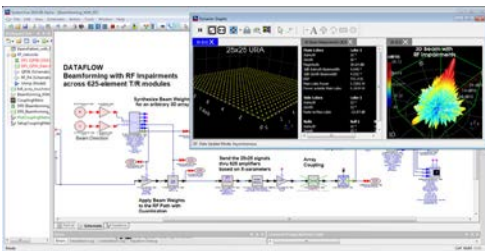
Adds unique spectral domain RF block simulator, and enables X-parameter and verification models from ADS/GoldenGate for RF highest accuracy.

SystemVue Product Structure and Options Summary (Continued)



W1465 SystemVue system architect

Versatile “Enterprise” bundle that includes FPGA, C++, RF modeling flows. Perfect for diverse workgroups to share on a network.



W1467 SystemVue array architect

Adds phased array antenna and beamforming design capabilities from W1720 to the W1464. Simulates hardware implementation effects such as S-, X- and Sys-parameters of phase shifters, attenuators and amplifiers. Predicts spatially radiated intermods for FCC emission compliance and interference to nearby antennas. Monte Carlo element failure analysis ensures mission critical AESA design.

Consulting Services and Education

SystemVue consulting services

- Start-up assistance
- Custom training, including applications and libraries such as LTE, DOCSIS, and Satcom
- Custom model development, including IBIS AMI SerDes components
- Automation with test equipment
- Integration with 3rd party applications, such as AGI STK
- Access to C++ source code, IP
- Additional topics, as arranged

Education and services

SystemVue-related training and custom consulting services can be delivered at your site, or at a convenient location near you. Typical services are listed below. Also, annual support maintenance is recommended for all SystemVue products, since the software is typically updated twice per year, and significant new capabilities become available within the base platform and libraries.

SystemVue training classes

- SystemVue fundamentals
- Digital pre-distortion with the W1716
- Radar signal processing with the W1905
- IBIS AMI modeling with the W1714



Try SystemVue today!

www.keysight.com/find/eesof-systemvue-evaluation

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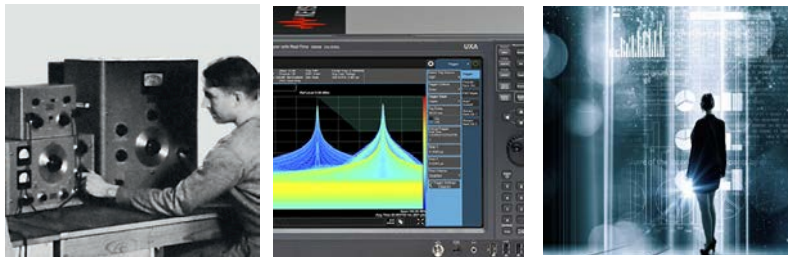
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Evolving

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