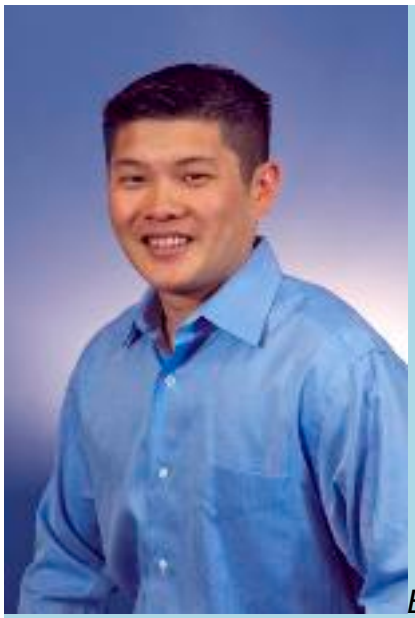
Software Design Tools

Question: *How can effective use of software design tools improve the product development cycle and help the designer engineer get it right the first time?*



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Successful product development teams are made up of engineers who can span multiple application domains and multiple design phases. They learn and adapt to changing project demands quickly and leverage each other's knowledge to address their own design challenges. Most also recognize that the effective use of design tools improve the product development process and the overall product performance and quality.

Traditionally, in wireless systems design, digital baseband, link layer and RF/analog groups would each use different design tools to develop components in isolation. This not only prevents knowledge sharing but also causes system-level errors to remain hidden. Model-Based Design contributes to and integrates the many design domains of a wireless system in a

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"Improving the product development cycle and help the designer engineer get it right the first time" is the most fundamental goal of every software design tool. How well it succeeds depends on a number of factors, from its overall ease of use, to the quality of its algorithms, the depth, breadth, and quality of its models, the integration of its various elements, and most important of all, its basic architecture. A recent example - highlighted at IMS2011 in Baltimore, MD - illustrates how AWR's Microwave Office software and its underlying technologiesare able to achieve optimum results and empower designs to get it right the first time.

Earlier this year, a design team from M/A-COM Technology Solution's Santa Clara group was tasked with designing a next-

single environment. In a multi-domain design environment system level-tradeoffs factor individual component interactions across the various design domain boundaries. This approach offers early checks for whether system-level requirements and metrics being met, and helps monitor requirements compliance throughout the design cycle.

Disjointed design phases are the other major source of design errors. Model-Based Design addresses the handoff from specification to implementation inherent in most design flows. To be effective, the environment needs to allow design at a wide range of abstraction levels. During the early phases of design a behavioral or functional simulation could be performed. This model provides a good environment to rapidly iterate and find the best design alternative. As implementation details become available, rather than handing off the design, they are added to the model which serves the role of an executable specification of the original design. Engineers then automatically generate code and test cases from the model. Staying in the same environment from requirement to test minimizes the amount of manual work and the possibility of design errors. Further, testing can now begin at the requirements phase itself by simulating executable specifications in models to verify that the requirements are met. As a result, defects are caught and removed earlier, lowering the total cost and time for development.

Software design tools help create and use models as executable specifications of designs, and drive the complete design from concept to implementation in a unified environment. This Model-Based Design flow enables engineers to improve the product development cycle and help the design engineers to reduce errors, and significantly improve the chances of generation LNA for use in various end markets. AWR’s Microwave Office software allowed this team to eliminate on-chip RF inductors, commonly found on LNAs,and to shrink the final footprint by more than 60%. This was accomplishedby using active matching as a design option within the Microwave Office software. By first simulating the virtual design in AWR software prior to manufacturing, the design team was not only able to meet their targeted performance specifications and also significantly reduce the circuit’s area. The virtual simulation results were then overlaid with prototype measurements on Anritsu’s VectorStar VNA (on which Microwave Office software was also running) to provide further assurance that the virtual design and prototype were in good agreement and add one more check in the box that this design team got it right the first time.

getting their designs right the first time.

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