EDSI
Electronic Design Solutions, Inc.

As an interesting exercise, take a look at some of your older electronic designs and write down the first thing you notice. Does anything stand out? Perhaps not surprisingly, the designs developed 5-10 years ago are far less complex than those you do now.

When you look at these designs and progress through the years, you may also notice some trends emerging: shrinking board real estate, more components, the introduction and increased use of programmable devices. Whatever you notice, one thing is certain: today's designs are more complex than ever and without updated software, you may not be able to produce the same kind of results.

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Mike Reagan, Engineer, Electronic Design Solutions Inc.

Electronics Design Solutions:
Making increased design complexity

Mike Reagan is an electronics design consultant with Electronics Design Solutions, Inc. He has designed all kinds of electronics and has seen how they have evolved over time. He has designed for several high-profile organizations that include to AT&T Microelectronics, Mitsubishi Electronics America and the NASA Goddard Space Flight Center. Mike tells of how much his designs have changed over the years and how he deals with the complexity it presents.

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Mike has been able to manage this design complexity because he takes advantage of the latest design technologies. For example, there has been a significant emphasis on higher levels of abstraction and design automation in recent years. Features such as auto-routers, design rules, pin and part swapping and multiple channels are helping engineers automate processes and reuse design sections.

"Designs constraints, design rules and programmable design rules in Altium are robust. It allows me a tremendous level of flexibility. This is particularly important because every design is unique in its own way. With these features, Altium allows me to address all the design challenges of each and every board."

"A perfect example of how we used Altium to deal with increasing complexity was our job with NASCAR. We were contracted to design the gauges used in all the racing vehicles. This was a significant project that took several years to complete. During this project we upgraded several times, taking advantage of Altium Designer's continuous improvements. Over the years we had to use more and more designs rules and tricks. So, we are driven to continually upgrade. The status quo was not enough."

Mike also describes the NASCAR project as 'tight', saying that managing the MCAD-ECAD process was a particular challenge. He was able to take advantage of Altium Designer's real-time ECAD-MCAD dynamic collaboration feature when they became available in summer 08 release of Altium Designer.

"We had a lot of mechanical constraints. It was very tight package. So we had to do a lot of data exchange with the customer's database, and use the 3D MCAD-ECAD design collaboration. This is one of those features that we couldn't have done without."

But rising design complexity is the combination of several factors, and FPGAs was one of those factors for Mike. FPGAs offer new performance and price opportunities, but they also place additional pressure on traditional design flows. With FPGAs, engineers like Mike must suddenly manage several hundred pins from a single FPGA, and synchronize those pins with the PCB. It is an almost maddening experience. But Mike was able to overcome this with the use of the board-level pin-swapping capabilities in Altium Designer.

"We use the pin-swapping feature in Altium Designer for large FPGAs with more than 1,500 pins. It allows us to easily synchronize our board with our FPGA designs. And Altium Designer's unified architecture means that when we make these changes, they are automatically reflected throughout our schematic designs as well."

Having board and schematic designs unified also means that it is easy to update designs and make changes. It also helps to eliminate errors and it allows for better version control.

"The unified environment in Altium definitely helps. It just means we don't have to worry about the schematic, board and FPGA being in sync. Altium Designer takes care of that for us. It means you can make all your changes without having to going back and forth between design domains. It definitely saves time when you have to update schematics for customers."

Another benefit Mike has found is during post-assembly documentation. This is something that Mike now does all inside Altium Designer.

"We are able to panelize our Gerber files in Altium Designer, which means we can go into production with confidence. We also take advantage of the additional mechanical layers in Altium Designer, sometimes using up to 16 layers. With features like these and Multiple Output publishing, we are able to do all our post assembly documentation using the same database. It's just so much easier now; it takes half the time it used to."

For Mike, it is about taking advantage of the latest design technologies so that he can focus on the larger picture, the final working product.

About Electronic Design Solutions

Electronic Design Solutions, Inc. is an electronics design consultancy located in Frederick, MD. The privately-owned business specializes in electronics designs for commercial and aerospace organizations, and turn-key solutions for bare board manufacturing and assembly. For more information on Electronics Design Solutions, please visit: www.boarddesignnow.com