

INSIDERS' GUIDE: FPGAs, TOOLS, AND BOARDS



FEATURED INTERVIEW:

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ALTIUM: INNOVATION IN FPGAs AND BOARD DESIGN

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Q. First of all, tell us a little bit about yourself and your responsibilities at Altium.

- A. I have more than 13 years experience in the electronic design industry and a total of almost 20 years in the software industry. Some of my recent roles for Altium Ltd. have been as Product Marketing Manager and as Technical Marketing Editor, publishing in a range of well-known industry magazines and journals. I have completed a Bachelor of Science Computer Science with Honors from National University in California.

Q. With respect to your *Altium Designer* product, how does the product positioning differ from those of other third parties in the FPGA space like Mentor Graphics or Synplicity? What does your “target project” look like? What is a “typical customer?” What specific needs do you address, uniquely?

- A. At its core, *Altium Designer* differs in being a unified design solution, the only one of its kind on the market. Unified means a single data model, a single design process, a single design application; and a single, coherent model for the design – all visible to the entire design team, across FPGA design, PCB layout, and the touch-points and outputs to manufacturing and the mechanical design elements.

That’s quite a summary. Perhaps the better comparison is in asking how many tools are required to complete a design from concept to manufacture. If the answer is more than one, you don’t have a unified solution at your fingertips.

Altium Designer provides that single, unified solution. This unified approach means that any designer, across any discipline, operating in any vertical market, can benefit from adopting *Altium Designer*. It equips them to create their next generation of electronic products, in a world that is competitive, that is seeing seismic shifts in where design is done, and who is tapping into tomorrow’s devices.

Because Altium’s solutions are designed for use by all electronics engineers, there is no typical user or project per se. A snapshot, however, of projects and customers shows that Altium solutions are used daily by many of the world’s leading organizations across a range of industries including telecommunications, automotive, aerospace, defense, medicine, science, and consumer electronics. *Altium Designer* is used on PCB layout, rapid prototyping and FPGA synthesis to prototype and then to final layout and manufacture.

Q. Tell us about the Altium Desktop NanoBoard. Is this primarily for evaluation / prototyping? Deployment? Both? How does it compare with a complete do-it-from-scratch approach?

- A. The *Altium Desktop NanoBoard* is a high-capacity, low-cost reconfigurable hardware platform based on the power of programmable devices. It is also much more than that, delivering unprecedented power for rapid system development and implementation into the hand of

today's engineers.

A little explanation on why this is important – most platform solutions today are based on a specific FPGA device technology. This means they require an implementation that is rigid and tightly coupled to the platform itself. This implementation will almost certainly be limited to the HDL language of that specific platform and will forever trap the engineer into requiring technology from only the device vendor.

The Altium *Desktop Nanoboard* overcomes this by not only offering the programmable hardware platform that is reconfigurable, but more importantly one that is vendor independent – an industry first. Engineers can suddenly explore their designs upfront without having to commit to a particular type of implementation and before it's decided what their product will even do. They can rapidly develop, implement, debug, and deploy an entire design before even moving to the production PCB. Design focus is suddenly back onto product innovation and less into managing the complexities of design implementation. Naturally, this opens up education possibilities not just for graduates but even the most experienced engineers.

But the single biggest advantage is that 'do-it-from scratch' for product design is finally brought into the 21st century. When you look at how most system design is done today it's an obvious case of the cobbler's children wearing the worst shoes. No one today would dream of using a hand crank to start their car. But ironically that's exactly how electronic design today is approached – with outdated and disparate tools based on design flows from over twenty years ago.

So, as part of a new approach, the Altium *Desktop Nanoboard* provides engineers with an architecture to work seamlessly and in full synchronization within a development environment for maximum flexibility, real-time on-board power monitoring for system analyses, and automatic peripheral and daughterboard configuration. The need then for working in a simulated environment or building multiple working prototypes (which are both costly and time-consuming) is no more. And 'do-it-from scratch' approach is once again focused on real innovation – where the real design value is. To underscore this point, one Altium customer reduced his prototype model from weeks to five days.

Q. One of the most exciting new products has been Altium's *Innovation Station*. What is the concept behind the *Innovation Station*? What sort of projects is it most applicable to?

A. The Altium *Innovation Station* brings together the award-winning *Altium Designer* unified electronics design software with the *Altium Nanoboard* reconfigurable hardware platforms to provide a complete electronics design and deployment environment.

The high level concept is to provide a complete design environment that puts programmed device intelligence at the center of the design process to support continuous design innovation. This means a whole new approach to electronics design with a number of immediate benefits for engineers. For example, IP that is programmed into the system is much easier to protect than the physical IP as the source isn't shipped with the product. Soft design can happen before the hardware platform is designed, and can continue after the hardware is manufactured and even delivered to the customer. It also provides the basis of an electronic ecosystem to better connect with customers.

The Altium *Innovation Station* offers a number of design advantages such as libraries that are more than component symbols and low-level code libraries complete with preconfigured hardware and software drivers. Hardware blocks that go beyond mere schematics based on plug-and-play hardware I/O modules that are ready to connect to chosen processor and FPGA and on-the-fly hardware generation for the most versatile deployment options are just a few of

the features it has.

This makes the Altium *Innovation Station* ideal for projects requiring system configurability and reusable standard hardware and software components. Any project requiring high computational and programmable capabilities such as systems prototyping and industrial automation make ideal project candidates. Or, it can be used by design teams simply wanting to explore an idea on a quick, prototype platform.

Q. Altium is often perceived as focused most strongly on FPGA / PCB integration. Yet many of our readers are interested in FPGA design only, and often turn first to the “free” tools of Xilinx or Altera. How do your products compete with (or complement) the “free” tools provided by Xilinx or Altera?

A. From a design perspective, *Altium Designer* would be used as a replacement for vendor tools. Because the system works with and creates vendor tool compatible projects, designers can move between the two environments for specific tasks when needed.

However, when preparing a design for download to an FPGA, *Altium Designer* uses the vendor-supplied tools to handle the low-level mapping and place-and-route functions for the specific target devices. This is done transparently through the *Altium Designer* GUI and the designer does not need to manually run the vendor tools to create the necessary bit files or download to the FPGA device. In other words, we use specific functions of the vendor tools as device-specific ‘drivers’ for low level functions so that the designer doesn’t have to.

And that’s the beauty of the system. *Altium Designer* is completely part and vendor neutral and supports a wide variety of devices. Also, while *Altium Designer* has its own target-independent synthesis engine, it does support both vendor synthesis engines and some popular third-party synthesis tools as well.

Q. Recently Altium made an exciting announcement regarding “3D PCB” technology. Tell us about this initiative and how you are helping developers see their PCBs within the final system and integrate them in “3D.”

A. Yes, it’s very exciting because for the first time, electronics designers working in the 3D world can design in real-time 3D! Real-time collaboration between electronics and mechanical designers has recently been made possible with new 3D PCB Visualization technology, allowing engineers to fit their boards into enclosures in real-time, in 3D, and without guesswork. By using a non-proprietary STEP 3D file format as a mechanism, *Altium Designer* allows ECAD-MCAD collaboration without forcing organizations to purchase costly integration add-ons or use a specific mechanical CAD package.

Altium Designer lets designers create the board shape directly from the case model, do full mechanical fit and clearance checking, and update their board design or component choice and placement to ensure a perfect fit and conformance to physical design constraints. If the mechanical designer changes the case design for example, this is updated within *Altium Designer*. The complete board design can be outputted afterwards for use by the mechanical engineers.

This technology significantly reduces the number of time-consuming, error-prone and costly design iterations currently necessary to close the ECAD-MCAD loop. More importantly it allows real collaboration not possible before between increasingly interdependent areas of design.

No more “*doh*” moments when the electronics doesn’t fit the casing!

Q. Tell us a little bit about your company.

- A. Altium has headquarters in Sydney, Australia with sales offices worldwide, and resellers in all major markets around the world.

Altium provides world-leading unified design solutions for creating next generation electronic products. Nick Martin, CEO, founded Altium in 1985 with a vision that still guides the company today: to provide every engineer and system designer with easy access to the best possible design tools. Consequently, we develop market and support unified an electronic product development solution that helps all engineers and designers to turn their design ideas into products as easily, efficiently and cost-effectively as possible. This is the driving force behind Altium and is still the vision that guides our strategies today and into the future.

We believe that *seeing is believing*, so one of the best ways to start investigating *Altium Designer* is to sign up for one of our regular live Web conferences. Altium engineers will demonstrate the system while you watch and ask questions from the comfort of your own computer. Follow the link from the Altium home page at <http://www.altium.com/>

We also have a very comprehensive set of on-demand demo videos available at the Altium DEMOcenter, which can be found at <http://www.altium.com/Evaluate/DEMOcenter/>.

For more detailed product evaluations, we recommend customers contact their nearest Altium Sales and Support Center or Value-Added Reseller, who can arrange for special evaluation kits and licenses. <http://www.altium.com/Contacts/>.

Q. What do you believe is the next generation of electronic design? How does Altium's approach work and why do I need to move to the next generation design solution?

- A. Electronics design technologies and the electronics industry is rapidly changing. The rise of globalized markets and manufacturing, and increasingly sophisticated product designs and new technologies mean that more complex designs need to be brought to market more easily and with a greater emphasis on innovation.

The electronics design process itself has also fundamentally changed. More developers are involved in the process, design disciplines are merging, cross-team collaboration has become essential, and software-centric design is now defining what was once defined by hardware.

The issue is that yesterday's approaches are based on yesterday's design models. They are reaching the point of diminishing returns with respect to coping with today's design requirements. No matter how much you might add features and improve the loose connections between the individual data systems of the process, the fact remains they will still remain as silos struggling to interact.

Altium's next generation solution puts soft design at the center of product development. All team members can plug into a single design environment and approach that works off of a single date model. Concept exploration without having to commit to hardware is real-time and rapidly taking any custom board design to manufacture is suddenly possible (rapidly here meaning 30-50% faster results).

In short, *Altium Designer* provides one coherent system for tackling what is essentially a single task – developing an electronic product from concept to reality. To put it simply, why would you just continue to just get by, when you can easily go forward into the future of what will be electronic design?

Q. Thank you for this interview.