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Innovate for the upturn

Unleash creative and innovative solutions that would have otherwise been suffocated by time constraints and unnecessary complexity. Focus on the job in hand and get more from your measurements.

NATIONAL INSTRUMENTS

National Instruments transforms the way engineers and scientists around the world design, prototype and deploy systems for test, control and embedded design applications.

Using NI's open graphical programming software and modular hardware, customers at more than 30,000 companies annually simplify development, increase productivity and dramatically reduce time to market.

From testing next generation gaming systems to creating breakthrough medical devices, NI's customers continuously develop innovative technologies that impact millions of people.

In today's tough economic climate, it's never been more difficult to justify investment in capital equipment. In fact, in many organisations, approval for investment is now going to Senior VP, CFO and, in some cases, CEO and board level.

In such turbulent and uncertain times, it falls upon everyone in the company to look at how they are operating and how they can make a positive contribution. In the world of test, which is often perceived as an overhead and drain on already thin profit margins, engineers from design through to manufacturing have to take a fresh look at their development process and figure out how to lower costs and speed up development cycles.

Those organisations that can embrace change now will be better placed to compete as the global economy emerges from recession. Engineers across the organisation can make a critical contribution that will ultimately impact top line revenue and bottom line profits. What can you do differently that will make the difference?

BUSINESS IMPACT

Whether your industry is involved in automotive, defence, communications or consumer electronics, to name a few, there are many opportunities to come up with creative and innovative solutions to business problems (even in today's climate).

Typically, the first road block is justifying the time and money to invest in a project that could unlock real savings. The key to unlocking this investment is the business case. Here's an example of what can be done. Hella, a €3.9 billion international automotive company

faced with a growing diversity of products, was able to realise a 46% reduction in operational costs of test while increasing test throughput by 57%. This was achieved only eight months after assembling a cross functional team. Another example is Harris, a \$4bn international communications company serving government and commercial markets. Harris was able to reduce the cost of test by 74% whilst meeting increased volume demand for its Falcon II radios. It achieved a return on investment in new test equipment in less than three months.

At the recent NIWeek conference in Austin, Texas, Analog Devices demonstrated a new production test platform for its MEMS digital microphone. These devices are low cost and are produced in high volumes. Analog Devices needed to find a much lower cost solution to replace the costly traditional 'big iron' testers. With a relatively short development time, it created an innovative test solution based on LabVIEW and PXI to reduce the capital equipment cost by a factor of 10.

These case studies highlight the potential benefits that your organisation can harness. In many cases, it's not a choice, but a matter of survival in a competitive marketplace. Realising these kinds of benefit will require investments and a clear understanding of impact to the business.

LEAN INNOVATION

Whether you are designing new product design or reengineering a new test platform, the key processes will typically fall into three main categories – design, prototype and deployment. The key to productivity is leveraging know how and expertise across these disciplines.

The challenge today is that not only are there fewer resources to dedicate to each individual function, but the timeframe to complete this process is reduced dramatically. Fundamentally, the challenge is to do more with less, to speed the time from design to prototype and to ensure that you are leveraging the wide array of network resources available.

This is the essence of lean innovation and there are many opportunities to apply these concepts to your business today.

DO MORE WITH LESS

In the past, there may have been a whole team dedicated to the design process, including digital and analogue hardware engineers, mechanical engineers, application software engineering, as well as a separate embedded software team. Clearly, this is no longer the case and downsized teams need a new approach that combines disciplines.

Taking a higher level system view using the latest graphical system design tools can simplify the design process whilst removing lower level complexity. This approach requires an abstraction level that allows domain experts to focus on the product design or new test platform. These system tools include a variety of high level design models such as dataflow, C code, text based maths and state charts.

The key is a more productive process that scales the engineering team's skill set. This unleashes creative and innovative solutions that would have otherwise been suffocated by time constraints and unnecessary complexity. Simply put, you get to focus on the job in hand!

In addition to these system level tools, there is a need to simply speed test times, whilst reducing costs. The latest quad core and octal core PCs provide an effective way to achieve this goal. Using a combination of multithreading and multicore ready graphical development tools, engineers can maximise test performance in an intuitive way, leading to significant productivity improvements.

In the Harris case study, engineers used a parallel testing architecture to achieve a 400% improvement in test throughput. This use of multicore technology is clearly a trend that will continue to drive up performance of test systems, whilst lowering overall unit costs.

DESIGN AND PROTOTYPE COME TOGETHER

Another key component of lean innovation is the ability to prove out a new idea quickly and, in this economic climate, speed is critical or the idea will never get off the ground.

New prototype platforms are now available in industry standard formats that allow rapid design and prototyping to be done simultaneously. The latest FPGA technology, combined with graphical programming and real world I/O, provides a powerful platform to allow a new algorithm to be prototyped very

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quickly. For example, you may want to incorporate some high speed custom decimation of digital communications data on an FPGA in order to try out a new measurement routine. These new tools bring productivity to a new level, but more importantly, facilitate a more creative process that can lead to breakthrough innovations.

It doesn't have to end here; deployment platforms are available that can use the very same code without reengineering your design.

LEVERAGE THE NETWORK

History tells us that innovation without a network is unlikely to succeed. I particularly like the way Henry Ford put it when he said 'I invented nothing new. I simply assembled into a car the

discoveries of other men behind whom were centuries of work ...'.

We only have to look at more modern day examples, such as Apple's iPod, to see how the network plays a critical role in spurring innovation. The underlying point for engineers is to maximise the use of tools and technologies that exist, reusing them in ways that are innovative and which create value for the organisation.

Software tools that characterise lean innovation have a well established ecosystem that brings huge potential to reach out and reuse technology, allowing you stay focused on your goals.

National Instruments has created a highly leveraged network for engineers and scientists around LabVIEW, its graphical programming platform. Key components are a strong community of 70,000 online members and more than 100 user groups. In addition, there is a wide

collaboration of partners, with more than 280 add on products, more than 400 solution providers and more than 35 training courses. Finally, designers can be connected to the real world using more than 7000 instrument drivers, hundreds of smart sensors and more than 1000 third party programmable automation controllers. There are thousands of man years of effort in this network alone that can be leveraged into a business solution that will make a difference.

No doubt the economic recovery will come, but whether it's U-shaped, W-shaped or whatever, I have no doubt that engineers will be prime movers in determining the speed of recovery. The ability to build a business case, combined with a nimble process of lean innovation, is a great opportunity that must grasped.