

## International Rectifier Baselines Teams' Productivity Across Automotive, Industrial and Telecommunications Design Projects

### In Brief...

#### Challenge

Create a common product-development methodology to improve productivity across many, dispersed small design teams.

#### Solution

Use Numetrics NMX-ERP™ suite and its fact-based approach to product planning to benchmark teams against industry norms and measure productivity. These teams designed devices for highly competitive applications segments, such as automotive electronics, industrial control and networking.

#### Impact

Increased insight helped International Rectifier managers see how they could measure productivity of their teams. Using Numetrics helped IR design and development teams understand how they compared with industry peers.

#### Value

Numetrics' software suite helped IR management begin to build a culture of continuous improvement and more predictable development schedules. This enabled the company to better manage engineering costs and get products to market faster to generate better sales.

A combination of relentless innovation and acquisition has fueled the growth of International Rectifier, one of the oldest continuously operating semiconductor companies in the industry. Founded in 1947 by Eric Lidow, an engineer who fled Nazi oppression in World War II for the United States, IR has built an engineering culture noted for small, flexible, global teams that pride themselves on low cost of product development.

### The Challenge

The small-team approach faces two challenges:

**First**, growth-by-acquisition can lead to widely dispersed teams from different backgrounds with different approaches to design. That situation, in the aggregate, can lead a company to be less productive than its industry peers.

**Second**, small teams often are asked to work with design projects of higher and higher complexity. Design teams schedule projects of a certain size to be finished in a certain time frame, and those assumptions may not be valid on the next, more complex project.

### Seeking Transformation

Rick Sivan, IR's vice president of the Design Platform Group, believed there was an opportunity to cultivate a culture of continuous improvement marked by

- Predictability and consistency
- Fact-based new product planning
- Accountability and transparency.

Executives wanted to enable a large organization of small (2-5 engineers, typically), talented and widely dispersed analog IC teams to operate within a common structure using a common language. Managers also wanted to give their teams a more objective way of measuring project complexity, benchmarking against not only their internal projects with consistent metrics but against industry peers. And they wanted to boost engineering productivity. It was an ambitious—but achievable—set of goals.

## The Solution

IR engaged with Numetrics and tools from its **NMX-ERP™** software suite to address these needs. NMX-ERP's IC Project Planner uses fact-based, top down approach to estimating project staffing requirements and development cycle time that complements companies' traditional bottom-up approach. NMX-ERP's Industry Benchmarking software compares companies' projects to their competitors, highlighting similarities and differences across key metrics, such as cycle time, silicon spins, productivity, throughput, and so on.

Together, IR and Numetrics performed benchmarking, risk analysis and fact-based planning on 15 design projects spread across three platforms and multiple design locations. These projects included a high-side switch to drive a fast glow plug in diesel engines; a power MOSFET for washing machines and a voltage regulator with tracking for telecommunication systems.

For Massimo Grasso, executive director for IC Development in IR's Automotive Business Unit, using Numetrics technology would start with self-examination and lead to short- and long-term improvement in product development.

*"We wanted to understand our flaws and, as much as possible, compare ourselves with the other companies in the same industry and see how we are performing,"* he said. *"We wanted to establish a way to measure ourselves in an objective manner. Then, starting from that, we wanted to see how we can improve."* he added.

The timeframe was tight: Training and entering data from the 15 projects at six sites occurred during a five-week period. By introducing teams to IC Project Planner, IR and Numetrics wanted to achieve several objectives, including:

- Driving fact-based planning
- Identifying reference projects for productivity base-lining
- Synthesizing project plans

- Enabling what-if tradeoffs between complexity, schedule and staffing
- Facilitating fact-based risk analysis, including identifying a reference set for that analysis
- Benchmarking assumptions in IR's bottom-up plans.

Despite the ambitious goals and all the moving parts, IR teams took less than one person-day to enter each project into the NMX tools.

*"We wanted to improve our new-product introduction process and our productivity,"* Sivan said. *"I expected Numetrics software would provide insight to how our new product development process stacks up against other analog design companies."*

### Increased Visibility

In deploying NMX's Industry Benchmarking tool for three of IR's project platforms, two common threads emerged. Firstly, IR had higher schedule slip than the industry norm. Secondly, IR required more silicon spins than the norm for their segment.

Using IC Project Planner, the teams discovered ways to quantify their project complexity and adjust staffing and tapeout strategies. Taking this into account and leveraging Project Planner, the teams, collectively or individually:

- Increased design effort and team size commensurate with the increased complexity of their projects
- Combined these approaches to boost the team throughput
- Aligned all major key performance indicator (KPI) targets (effort, duration, spins, productivity) with industry norms.

*"Risk is always difficult to assess, so if you have a historical data that proves that you're wrong or that you're too aggressive, that's a good way of quantifying a risk,"* Grasso said.

Given the disparate methods and results IR teams had used and encountered in the past, it was important to Sivan to create a baseline upon to which to build a culture of continuous improvement.

*“Numetrics gave us a much higher cognizance of the importance of a baseline—what is our historical capability in different areas?” he said. “Project Planner helped us to gauge the relative complexity of certain markets we address, certain types of applications, what has been our historical performance, what has been in schedule cycle time, in delivering certain amount of complexity per unit time per designer—all of that was extremely important.”*

### Conclusion

Numetrics’ software contributed to a cultural transformation within product development, as the three platform teams turned a corner and engineers accepted the importance of rigorously measuring past projects and using the measurements to predict output and effort for future projects. It resulted in two key process outcomes:

- Insight gained from benchmarking led to a change in methodology on new projects
- IR modified its shuttle methodology to lessen the dependency on empirical design feedback on certain product lines.

*“The planned projects I am now seeing are more realistic in their scope and assessment as to what it takes to be done. I am seeing some evidence of improved performance to schedule,” Sivan said. “I will make a claim that Numetrics has had a positive impact on the way we plan our new product development.”* Ultimately, the gains IR accrues from boosting engineering productivity will tie directly to bottom and top lines.

Numetrics-powered engineering organizations have boosted productivity by nearly 40 percent

and sped cycle time by nearly 10 percent. In a scenario in which each week’s slip on an IC project chews up more engineering resources and means less time to exploit a lucrative emerging market, these productivity improvements are significant. They’re all the more important as the semiconductor industry enters a new era of competition in which product-development productivity is a key business differentiator.