

## Harris Semiconductor

*This article was originally published in the January 1999 issue of Midrange ERP magazine. It appears on the AGI Website with the permission of Midrange ERP.*

### TOC Case Study: Harris Semiconductor

Harris Corporation's Mountaintop, PA semiconductor products plant used the Theory of Constraints (TOC) to create an industry powerhouse. In a commodity business, discrete power semiconductors produced at the rate of 20 to 30 million units per month, TOC transformed a 30-plus-year-old plant from industry follower to shining star. In four years, throughput grew at 40% per year while the industry grew at an average of 10 to 20%. Inventory turns went from two to seven (industry average is three) and is headed for 10. In four years, the plant went from no profit to 80% of the semiconductor division's profit and 20% of the entire corporation's profit.

When Harris decided to invest \$250 million in a new wafer fabrication plant, it's not surprising that they turned to Mountaintop as the best group to benefit from this expansion. What is surprising, however, are the phenomenal achievements that the project team delivered using the principles described in *Critical Chain* for applying TOC to management of the project.

For a project of this size, including the design and erection of the building, installation of equipment, hiring and training of employees, and ramp-up to 90% of designed production rate, a typical time frame might be around 54 months. The Project Raptor team delivered in 13 months. That's not a misprint; from project kick-off to selling product produced in the new plant took only 13 months.

One of the first tasks for the project team was to go through the traditional PERT/Gantt chart exercise for the project. The result: what Raymond Ford, Director of Plant Operations, calls "high-tech wallpaper." The 6000-plus tasks represented the "normal" challenge for project management - too much detail to be managed effectively. When the Critical Chain processes were applied, the resulting tasks, about 150, were much more manageable. Eventually, there were only four tasks, along with appropriate buffers and feeds, the project accomplished what most experienced managers would have considered impossible. And it was not all sunshine and roses along the way, either. Project Raptor managed to put up a building during the worst winter in the Northeast in 100 years. Weather-related delays cost the project about 40 days, and equipment vendor problems added another 15 days to the schedule. Nonetheless, the project was completed three days ahead of the revised schedule (original plans allowed 18 months, the revision brought it down to 13).

What about costs? Project Raptor came in at 4% over budget. Harris Corporate management considers that a "direct hit". Most large-scale projects would be happy with overruns considerably higher than that. Interestingly, the additional costs were not caused by the accelerated schedule but can be attributed to a slight change in scope - making the building a bit bigger than originally planned. Keep in mind, however, that the plant is producing and selling product a full 40 months earlier than the

"industry standard" of about 54 months for a project of this size and scope. The payback, in fact, is running at about two times the rate originally calculated by the accountants.

Following Critical Chain methods, the team made some controversial decisions along the way. For example, all of the employees needed to run the plant were hired and fully trained by the end of building construction, months before the start of production. Despite the extra costs involved, this decision contributed to the team's ability to ramp-up production in 21 days - compared to the industry norm of 18 months. And these additional costs (paying workers' salaries before they had anything to work on) did not cause the project to exceed its budget - a budget, by the way, that was established using conventional estimating techniques before any TOC scheduling was considered.

The Mountaintop team, after two major successes with TOC (turning the plant around and building the new facility), is using TOC in its marketing department and is planning to apply TOC to the introduction of 200 new products over the next 18 months. Industry norms and Harris "best practices" would target about 20 to 40 new products per year. Impossible? Don't underestimate the Mountaintop crew and TOC. Their track record speaks for itself.

*Copyright © 1999 Midrange ERP*

*A representative of Harris Semiconductor presented the company's story at the Jonah<sup>SM</sup> Upgrade Workshop in March 1997. That presentation is available on video (JSA-1).*

Also available is *Leading the Way to Competitive Excellence: The Harris Mountaintop Case Study*, a book written by Harris staff detailing their success.

---

[Privacy Policy](#)

Copyright © 1996-2002, Avraham Y. Goldratt Institute. All Rights Reserved.

TOC World<sup>®</sup> is a Registered Service Mark of The Goldratt Institute

Jonah<sup>SM</sup> is a Service Mark of The Goldratt Institute

TOC Expert<sup>SM</sup> is a Service Mark of The Goldratt Institute

Market Demand-Pull<sup>SM</sup> is a Service Mark of The Goldratt Institute