AVIATION WEEK

& SPACE TECHNOLOGY

BY MICHAEL MECHAM

Northern California Bureau Chief Michael Mecham blogs at: **AviationWeek.com**
mecham@aviationweek.com

COMMENTARY

MULTITASKING

Companies discover process control is key

Israeli physicist Eliyahu M. Goldratt, who died this past June at age 64, is best remembered for the Theory of Constraints, which focuses on the weakest links in an organization's production and management processes. Over the years, his pioneering studies have evolved and are often called critical paths or critical chains.

Constraints blossom where uncertainty is a given, such as when a new design is introduced or when a military depot or commercial repair center begins stripping an aircraft for a major overhaul. Too much WIP (work in process) exacerbates the situation. Schedules become obsolete. People try to do their best but are soon following local priorities rather than the project's. As WIP piles up, workers are assigned more tasks, leading to multitasking—doing too much, none of it well.

Keeping a critical focus on critical paths has helped save many a time-intensive project. But in recent years, Goldratt's insights have begun moving beyond the project stage.

Just as lean manufacturing has its kaizen sessions that allow employee feedback for continuous improvement, critical-paths management is an endless process. No sooner have you mastered one constraint by turning it into an asset than you go looking for another opportunity.

The process usually begins when companies are having trouble meeting delivery schedules, says Sridhar Chandrasekaran, vice president for strategic services at software maker Realization Technologies in San Jose, Calif.

Realization's software synchronizes a company's priority system to reduce its WIP. Its critical-chain approach encourages management to drop metrics such as dates for measuring progress in favor of establishing clear pathways for efficient production. After consultation with managers and employees, aggressive plans of action are created, but always with buffers of time, personnel and resources to account for production uncertainties. "There is an explicit agreement [with workers] that they won't be penalized" for missing the target, Sridhar says.

Eighteen months ago, Spirit AeroSystems began implementing Realization's critical-paths strategy in propulsion and structures business. "We had too much work being done in a lot of areas, so our progression was in very small increments," says Spirit's critical-chain project manager, Joseph Zenisek.

One of the biggest constraints was in engineering. "We never had enough," Zenisek says. The critical-path solution made "perfect sense" to the engineers, but still it was a cultural change. The new approach shifted engineers' focus to what needs to be done first before the next set of priorities is tackled.

Since implementing the process, Spirit Propulsion and Structures has seen an 18% reduction it its cycle time, says Engineering Director Steve Tryor.

The critical-chain approach was first applied to Spirit's pylon contract for the Boeing 787, and its inlet, fan cowl and pylon work on the Boeing 747-8. It is now used for work on 737NG thrust reversers and pylons and nacelles and pylons for Boeing 767s and 777s. It is applied to development programs, too, including pylons for the Bombardier CSeries and Mitsubishi MRJ and nacelles for the Gulfstream G650.

Another company that has deployed the critical-paths strategy is Delta TechOps, which was struggling to meet a 2006 revenue goal of $270 million as part of Delta Air Lines' 2005 Chapter 11 bankruptcy filing.

As they thought through what was constraining engine overhauls, TechOps managers realized it boiled down to the difficulty they had getting parts on time for reassembly. Fingers were first pointed at labor and equipment, but the culprits turned out to be policy and management constraints.

"Delta's current rules and methods of management were actually turning the repair and support system as a whole into a constraint," found a study by University of Tennessee Associate Professor Melissa R. Bowers and Delta TechOps Manager Gary Adams.

So the company began restricting engine releases into disassembly until it was sure repair and support shops could support them. Back-shop queues were improved by following a strict first-in-first-out scheduling discipline. Multitasking was avoided by assuring that the reassembly of an engine would only proceed when 100% of its parts were available. Realization's software tracked and managed component parts in real time, allowing managers to synchronize execution across all shops.

In a year, turnaround times dropped 15%, throughput went up 22% and

WIP levels were cut in half. And Delta TechOps exceeded its revenue goal by $42 million.

The critical-chain method also has been applied by the U.S. Navy's Fleet Readiness Center Southeast in Jacksonville, Fla., and by Boeing Space & Intelligence Systems. When it improved C-5 transport overhaul rates at Warner Robins Air Logistics Center in Georgia, Sridhar was corecipient of an award for operations research. ☻

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