



Engineering, a New Paradigm

*By Brian K. Seitz,
Intellectual Arbitrage Group*

Remember the 1960s? Engineers lived in bullpens. We were mostly male, pale and wore starched white shirts. We sat in a dark corner of the office chained to an old desk with little communication to the outside world.

Since then, the world of engineering has changed. In the 1990s, it's now possible to be free *- no longer are we tethered to a desk or a specific location. The dream of having your office on a Hawaiian beach is technically possible. With a laptop computer, Microsoft Windows NT Workstation software, a mobile phone connection and an Internet account, you have a virtual office. Whether that is practical or desirable is, of course, another issue.

Having harnessed the power of the computer to precisely manage vast amounts of data, we are now embarking upon another transformation in the engineering world. One that will alter the method, and manner, in which engineering is practiced.

Simply put, at the end of the day it will still be an engineer who will design a technical solution and the process to produce that solution. However, the means to that end will be different. Consider one aspect of the coming changes: electronic co-location, or the presence of "virtual corporations," allows companies from around the world to collaborate using readily available technology.

A virtual corporation is an organization created for its ability to rapidly and efficiently respond to a market opportunity. It has the ability to form and operate an organization of professionals and resources to meet a market need dynamically * irrespective of location. A virtual corporation will remain a viable business opportunity of which engineers should be capitalizing upon.

As an engineer, I am much more involved in the organization today, and my workload continues to increase in demand. But, my job is basically the same. I am still required to develop a cost-effective design, within the constraints my organization and customers have set. I still use graphical, numeric, and textual means to communicate the specifications of that design. The difference now is that I can communicate so much more effectively. Tools such as a Web browser have enabled engineers to share designs, plan strategies, and collaborate on product manufacturing.

Using the communications capabilities of the Web, I can converse with my customers and suppliers in real-time. With applications like NetChat or Whiteboards, I can interactively share design concepts prior to committing to production. Once a design is finalized, I can use a browser to search for my product components and vendors. Having developed a prototype, a manufacturing bill of materials, and a supplier's list, I can then search the Web once more for a contract manufacturing house or job shop. I can then negotiate the construction of the product using a short-term

contract via EDI or Web-based contract applications. Once my supply chain is completed in this virtual commerce-space, I then start my marketing and order management activities. Using the Web, I can follow up with scheduling, and monitor my order fulfillment. This last piece is done through a logistics management system, which I can out-source, to a company such as Federal Express.

Today, the task of the Engineering/Manufacturing professional has expanded into a race for continual product innovation and faster time to market. Couple these costs and schedule pressures with the reduction in corporate staff, as well as the many new relationships with customers, suppliers, distributors, and competitors, and you have the makings of a highly dynamic work environment.

Two decades ago, a major rite of passage was marked when a corporation grew enough to require computer technology. Now, companies without computing capabilities are finding it difficult to compete, thus learning about a new rite of passage. Giving engineers access to these tools is imperative. It allows for a virtual "bullpen," enabling simultaneous and overlapping projects to happen in a shorter production cycle. Bottom line: it makes us better at what we do.

So while, today, we engineers may resemble our bullpen-dwelling predecessors in the starch white shirts, the opportunities and dynamics available to us are of a different world. We should enthusiastically embrace those opportunities.

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