Chapter 2 On the Edge of the Possible

I understand that in the laboratory developing this [Control Data supercomputer] system there are only 34 people, including the janitor . . . Contrasting this modest effort with our own vast development activities, I fail to understand why we have lost our industry leadership position . . .
—T. J. Watson, chairman, IBM, in a 1963 memo

Tom Watson, the leader of the nation's largest computer company, was clearly frustrated. How could a small operation in the middle of nowhere outperform IBM? In his memo Watson referred to Control Data's Chippewa Falls, Wisconsin, laboratory where renowned supercomputer designer Seymour worked for ten years. As a matter of historical record, the design of the Control Data 6600 was well under way before the Chippewa Falls laboratory opened. The 6600 design group led by Seymour Cray was previously located in a far less romantic location, an old factory called the Strutwear Building near the Company's headquarters at 501 Park Avenue in Minneapolis.

Extraordinarily innovative people in a company that thrived by knowing how to help people *be* innovative made far-reaching achievements in computer design possible. The successful development of the world's first supercomputer required an enormous amount of know-how and insight. Seymour was a key factor, but the achievement also required a management willing to take serious financial risk. While popular mythology had the 6600 built by Seymour and a team of elves in the Wisconsin forest for a few dollars a year, the truth is far different. In fiscal year 1962 Control Data's revenues were $41 million, yet the company was betting several million dollars on a facility to create a supportive environment for an individual, not to mention the tens of millions of dollars necessary to support the development of that individual's ideas.

No doubt Watson's frustration was greatly exacerbated by the fact that this was the second time in less than five years that this upstart Midwestern company had beaten IBM to the punch. Control Data's Model 1604 had left IBM's scientific computers in the dust. To counter, IBM exercised its considerable marketing muscle with special "customer support" pricing policies and other marketing tactics that only the year before had nearly put Control Data out of business—new orders for the 1604 were scarce for almost all of the 1962 fiscal year. Yet not only had the company survived, it both improved the performance of the 1604 (making it four times as powerful as anything offered by IBM or any other company) and lowered its price. Nor did the Watson memo quoted at the beginning of this chapter end the story. Instead, it marked the beginning of a decade-long struggle that culminated in a bitter antitrust lawsuit eventually settled in 1973. By then Tom Watson had retired.

From its inception, the company thrived on challenge and on taking risks and daring to be different. It did this with enormous self-confidence, perseverance, and an intuitive understanding that innovation is key to turning risk into reward and transforming "different" into conventional wisdom. The challenges the people of the company accepted fundamentally were based on a belief in the transformational power of technological innovation. Even more, the company's leadership understood that technology—know how—resides in individuals and not in books, drawings, databases, laboratories, or interoffice memos but in individual human beings who could be given an environment that encouraged them to take reasonable chances using their *know-how.*

It is easy enough to ascribe the company's culture of creative prowess to its founder, Bill Norris. That would be unfair to the many managers and executives, individual designers, and administrative and sales people who gave shape to the business. These individuals were committed to the overall success and purpose of the company and maintained a tremendous sense of community. And there was trust.

Control Data was not a collection of clones. Technological talent ranged from awesome to mediocre. There also was no unanimity of opinion with regard to business or product strategies. For example, there was violent disagreement as to the best semiconductor technologies. For another, there was disagreement as to the relative importance of business units: those in the computer systems group looked upon themselves as the "real" Control Data. They, after all, constituted the founding core. Those in the OEM peripherals business saw themselves as the salvation of the company, because they were the cash cow that fed other businesses; and those in information services were, in their view, the wave of the future. These views were egocentric and, consequently, incomplete.

Control Data employed a mix of talent, viewpoints, energy, and personal values, from an unusually high percentage of truly dedicated individuals to a handful of free riders. Most important however, the small minority of negative influences never controlled the company's business strategy, its policies and practices, its morale, and especially not its capacity for innovation.

THE SEARCH FOR MORE POWER: PUSHING THE LIMITS OF COMPUTERS

Innovation in the early days of Control Data centered on the design of high-performance computers. The driving force that fueled these innovations was the plethora of complex problems to be solved in science and engineering. This went back to Control Data's ancestry in Engineering Research Associates (ERA). But complex problems were not limited to military applications.

In 1859, Col. Edwin Drake struck oil in Titusville, Pennsylvania. It was not an amazing surprise. He had observed oil seeping through the soil long before he drilled his first well. Rarely is it that easy to find oil. Sinking dry wells is a time- and money-consuming operation. An early method of oil exploration involved the mapping of underground areas that showed promise of oil, but detailed maps required enormous amounts of data and complex calculations. In one method of land-based oil exploration, for example, large hydraulic pistons would pound the ground, setting off shock waves of sound that were captured by geophones. The vibrations were converted to voltage, tracked, and recorded. No matter how much data geologists collected on magnetic tape, they were limited as to the number of calculations that could be performed—and thus limited in their understanding of the true nature of underground structure.

The stakes were high. Every hole drilled cost a lot of money whether or not