PRODUCT REALIZATION SYSTEMS

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The product realization process is the way in which AT&T moves from technology in the laboratories to products in the hands of customers. The goal of the process is customer satisfaction. Important features of this process include: (a) high productivity, enabling the company to meet its financial targets; (b) short intervals, to match the needs of the market; and (c) high quality levels, to meet or exceed customer expectations.

This issue of the *AT&T Technical Journal* focuses on the product realization process for design and manufacture. We do not discuss the up-front work of marketing or system definition and requirements, which specify customer needs in order to start the design phase, nor do we discuss the deployment and ordering processes. The emphasis in these articles is on the computer-based systems used by AT&T to design products and to manufacture them.

Quality is uppermost in our minds, because it is with high quality standards that we satisfy our customers' needs and meet our product realization goals. Thus, this issue begins with a discussion by Gundaker, Martinich, and Tortorella[1] of the tools available to AT&T designers that assist them in building quality into the design from the outset. Two systems are highlighted: a system for prediction and evaluation of reliability (SUPER) and one for statistical quality control (QC Toolkit).

In "Product Design and Introduction Support Systems,"[2] Burling et al. examine robust design techniques, reliability estimation techniques, and statistical quality control as well as a variety of software tools used individually or as part of computer-aided design (CAD) systems.

The research and development (R&D) community in AT&T has a long history of using the best techniques of science to aid in the process of design. Progress in tools for the design of silicon integrated circuits (ICs) has kept pace with the impressive increases in circuit functionality and complexity during the past decades. Design of circuit packs and the interconnection infrastructure of modern equipment is also optimized through the use of CAD tools.

Using a case study approach, Neve, Ray, and Sitarik[3] describe how a task force successfully focused on equipment and process-related issues, product priority, and simulation modeling to reduce manufacturing interval time in an IC factory.

Manufacturing high-quality, high-technology equipment at low cost and with short intervals requires resource management and production disciplines far better than those of the past. Well-integrated materials-planning and production-execution support systems span the spectrum of scheduling, tracking, and control in manufacturing and provide essential linkage with customer order processes. The articles by Gray and Ehlers[4] on business resources planning systems, by Franks et al.[5] on Productivity Improvement Systems for Manufacturing (PRISM), and by Campbell[6] on factory workstation controllers, address the manufacturing portion of the product realization process. The Business Resources Planning System (BRPS) provides criteria for identifying software solutions and procedural solutions to business problems. PRISM is a family of information systems supporting manufacturing execution functions for AT&T's factories. The Campbell paper suggests an architectural approach to the automation of factory control functions.

Such an interconnected product realization system must continually evolve to serve new needs of design and manufacture. It is buffeted by new technology coming from the laboratories, by new processes used in the factories, and by new demands from the insatiable market for information movement and management products.

AT&T people in the factories and in the laboratories are the instruments of improvement of the product realization process. We use our systems engineering resources, honed by decades of planning the evolution of AT&T's telecommunications network, and our skills in software and process design to give these people the best tools available to do their jobs better every day. In this way, we plan to keep AT&T a world leader in the technologies of product realization.

References

1. B. F. Gundaker, D. E. Martinich, and M. Tortorella, "Quality Technology in Product Realization Systems," *AT&T Technical Journal*, Vol. 66, No. 5, September/October 1987, pp. 5-20.
2. W. A. Burling et al., "Product Design and Introduction Support Systems," *AT&T Technical Journal*, Vol. 66, No. 5, September/October 1987, pp. 21-38.
3. J. M. Neve, F. D. Ray, J. P. Sitarik, "Improving the Performance of an Integrated Circuit Manufacturing Line," *AT&T Technical Journal*, Vol. 66, No. 5, September/October 1987, pp. 39-48.
4. J. C. Gray and M. L. Ehlers, "The Business Resources Planning System," *AT&T Technical Journal*, Vol. 66, No. 5, September/October 1987, pp. 49-60.
5. R. L. Franks et al., "Productivity Improvement Systems for Manufacturing," *AT&T Technical Journal*, Vol. 66, No. 5, September/October 1987, pp. 61-76.
6. R. L. Campbell, "An Architecture for Factory Control Automation," *AT&T Technical Journal*, Vol. 66, No. 5, September/October 1987, pp. 77-85.

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