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PHILADELPHIA, Pa. , April 3 --- General Electric today announced expansion of its computer time-sharing service enabling manufacturers to prepare coded tapes for numerically controlled machine tools in a fraction of the time required by manual methods.

Through teletypewriter terminals in their plants, users of the nation's nearly 14,000 numerically controlled machine tools may call over telephone lines on the computational power of a nationwide chain of modern computers to create accurate, economical tapes in minimal time, a GE executive said.

E. L. McCleary said that using the new capabilities of GE time-sharing service, parts programmers or other manufacturing specialists can now go directly from engineering drawings to ready-to-run tapes in a few hours or less.

The hours saved, he said, "permit concentration on the more creative, profit producing aspects of manufacturing such as improved machining techniques, better machine utilization, and work flow problems."

McCleary, marketing manager for GE's Information Service Department, in remarks prepared for the annual meeting of the Numerical Control Society here said the service is available now nationwide through time-sharing service centers operated by GE in major metropolitan areas.

GE time-sharing used by more than 50,000 people for a variety of technical and management computational tasks, is a technique permitting people at scattered locations to obtain immediate solutions to problems from a distant computer almost simultaneously. The computer, linked by ordinary telephone lines to an office teletypewriter, operates so fast it appears to be servicing all users at the same split-second.

McCleary said parts programmers do not have to become data processing experts, have prior computer experience, or learn new programming languages to use the GE service. N/C time-sharing employs a number of symbols and English-like words, similar to those used in manual numerical control programming.

A series of work-saving computer programs also has been developed and is stored in the GE time-sharing library. At the typewriter-like keyboard of the terminal in his office, the parts programmer uses the GE library programs to describe and analyze part geometry, calculate X-Y coordinates, format data for specific machine tool controllers, and direct the punching of EIA coded tape at the terminal.

McCleary pointed out that unlike using an in-house batch processing computer system or outside "software" firm, GE time-sharing service enables the parts programmer to maintain complete control of the entire tape generation process.

Having immediate access to the remote GE computer over a telephone line, the parts programmer can quickly correct any errors discovered in the tape after the machine tool is set up for production, minimizing machine idle time and the need to tear down an expensive setup.

"Time-sharing adds a new dimension to machine tool utilization," McCleary said.

At present it can be readily used to prepare control tapes for most two- and three-axes point-to-point numerical control machine tools. The service capability will be expanded with additional library programs now being developed for contouring, milling machines, and lathes, he said.

But even today, the GE service can be used to prepare tapes for contouring operations on many two-axis machines. Most firms are not taking advantage of this capability in their tools because manual programming is too complex, he observed.

Under development and field testing for nearly two years, the numerical control programming capabilities of GE time-sharing service are being effectively used by many industrial firms. McCleary cited several:

- . Using the GE service, Numerical Cutting, Inc., a custom, sub-contract parts manufacturer in the Buffalo, N. Y., suburb of Elma, was able to prepare a tape in 1-1/2 hours for a particular contouring operation which would have required more than 1400 individual calculations and 45 man-hours to obtain by manual methods. The firm is considering use of the service for production analysis and marketing studies.
- . In Cleveland, the Quality Gage and Manufacturing Co. has produced on the computer in 4 minutes a program tape previously requiring more than 1300 manual calculations and two or more days of preparation. In the business management area, the firm uses the GE service to compare budgets with actual operations.
- . Through the use of time-sharing, the Waldron-Hartig Division of Midland Ross in New Brunswick, N. J., has reduced 3 hours of manual parts programming to less than 15 minutes. The service is also applied to various research and engineering activities.

- . Columbus Metals Products Inc. , a Burlington, N. J. , manufacturer and designer of custom-built cabinets for the electrical and electronics industry, has realize a 300 percent improvement in production lead time with greater accuracy.

McCleary said a key factor contributing to the vast potential of time-sharing service for parts programming is its economy. Present user fees are \$10 per hour of on-line terminal connect time and 4 cents per second of computer time used. Teletypewriter service is obtained from the local telephone company and varies from \$85 to \$150 per month depending on the terminal and accessories selected.

Describing the new GE N/C time-sharing library programs, McCleary said one, called NCPTS, is used to describe the geometry of the piece to be machined in terms of points, lines, and circles in reference to a common coordinate system. The computer does the geometry calculations in seconds and sets up a list of X-Y coordinate pairs which is stored in the system as a Point Coordinate file.

Another GE program, NCPMP, is used to prepare the actual control tape format for a specific machine tool and numerical control combination. The format is based on data stored in the Point Coordinate file, instructions which direct the tool through the machining operation, and a description of the machine tool.

A program called NCEIA converts the control tape format into EIA code and directs the punching of a master control tape at the teletypewriter terminal.

McCleary said that as the parts programmer familiarizes himself with the GE service, he will be able to write and store in the system his own computer programs. Like the GE library programs, these can be quickly retrieved from the terminal. They are not, however, available to other service subscribers.