

## NCCS at IMTS Show in Chicago

NCCS will be displaying both its *NCL* 5-axis software and its VARIMETRIX 3D solid modeling software in its booth at the upcoming IMTS show being held in Chicago, September 4-11, 1996 (booth A1-9100). VARIMETRIX (VX) is a powerful full-function parametric solid and surface modeler which includes robust IGES, DXF and STL data translators. VX includes associative drafting, assembly modeling and NC manufacturing. Fast 3D dynamic rotation of shaded solid models and powerful inquiry functions allow quick analysis of imported data. Models can be numerically machined using VX or read directly into *NCL*, an NC program with complete tool control and multi-axis capability.

According to Mr. Donald Schultz, President of NCCS, "VARIMETRIX and NCCS are sharing technology and sales and marketing activities in order to offer the industry's best solution for product design and manufacturing affordable to any company. With NCCS coupled with VARIMETRIX, we feel we have



*NCCS new booth during construction challenged everyone at the Company. (left to right, Bob Conway, John Schumacher of Exhibitree, and Dave Schultz)*

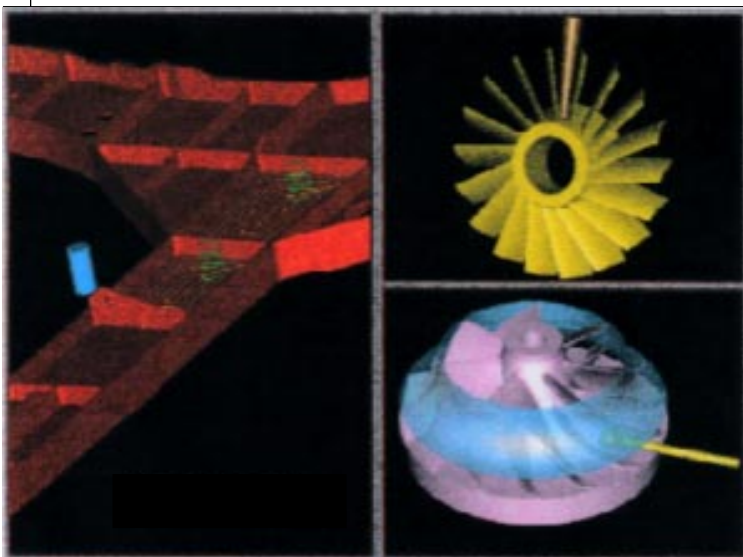
the industry's finest solutions in our respective areas of expertise. NCCS is a recognized leader in software solutions for multi-axis machining applications, particularly for aircraft and turbo-machinery components requiring 3, 4, and 5-axis simultaneous machine motion. NCCS' flagship product, *NCL*, is used throughout the world by leading manufacturers and hundreds of small, medium, and large suppliers to the aerospace, automotive, composites and turbo-machinery industries."

Mr. Schultz continued by saying, "NCCS and VX are combining their respective industry leading technologies into a single family of products which will boast state-of-the-art 3D solid design; fully associative 2D layout and drafting; assembly modeling; 2 through 5-axis solid/surface NC tool path generation; and NC verification and machine simulation."

### **Three New Modes for *NCL* .**

"NCCS has implemented even more control of five axis motion in our flagship *NCL*," said Mr.

*Continued of page 4*



*NCL allows even more control of 5-axis operations with three new modes. See it in operation at IMTS.*

# NCCS At Remmele Engineering

Remmele has a reputation for high quality workmanship and diverse manufacturing capability. Among the five manufacturing facilities that comprise Remmele Engineering are some of the largest machine tools in the Midwest. Products built by Remmele range from structural aircraft parts to large aerospace tooling. Remmele's General Machining Division, which comprises two of the five facilities, provides a wide range of manufacturing services to support three primary businesses:

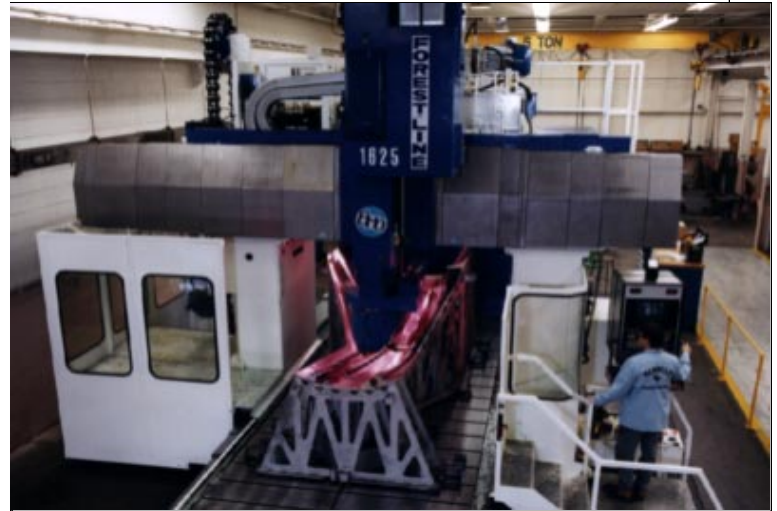
- **Low Quantity Manufacturing** - production of prototype, one-of-a-kind, and low quantity manufacturing of close tolerance, complex parts and assemblies.
- **Large Part Repetitive Batch** - Manufacture of larger repetitive batch parts ranging in size from a 2 foot cube to 100 feet in length and weighing up to 75 tons. These parts demand exacting tolerances and often require multiple machining operations.
- **Design and Build of Tooling** - Complete tool design and fabrication of large precise tools, including tooling for composite part manufacturing and large complex assembly fixtures.

For a contract manufacturer to be competitive, and yet profitable in today's global marketplace requires experienced personnel, state-of-the-art equipment and leading edge programming capabilities. Remmele Engineering has them all and then some. Remmele Engineering has over 45 years of experience in providing precision machining services. Many of the world's leading firms in the commercial, industrial, defense and aerospace markets have already surveyed and approved Remmele as a preferred supplier for machining and assembly of their products. In meeting the requirements for being a preferred supplier, several criteria are considered:

- Financial stability
- Consistent high quality product
- Total project management
- Lowest total cost and on-time delivery
- Continuous improvement in cost and quality

## Investment In The Best

Remmele has more than 120 CNC machine tools interfaced through a company wide DNC network. There are 25 varieties of NC machines at the New Brighton, MN facility and 15 at the Big Lake, MN facility. The key to Remmele's productivity is its



*Remmele Engineering's extensive manufacturing operation has 40 varieties of CNC machine tools, including many like this large Forestline gantry mill.*

its manufacturing system consisting of "generic" machines that can handle a variety of parts ... such as machining airplane parts in the morning and computer parts in the afternoon.

Although its plants are filled with an array of high tech, state-of-the-art equipment, equally important are the machinists and the company's NC programmers. In order to meet the strict quality control and delivery requirements of its customers, Remmele has made a tremendous investment in its in-house NC programming capabilities, which includes 12 seats of *NCL* multi-axis machining software. Because Remmele deals with aircraft manufacturers and the automotive industry, the attitude is to keep one step ahead of its customer's programming capabilities. According to Terry Morri, Programming Manager, *NCL* was selected because of its five-axis capabilities. Terry stated, "We wanted to make sure the vendor had a proven track record with five-axis installations, which NCCS had. Furthermore, *NCL* is a high-end programming system that allows for easy program maintenance and updates. When engineering changes or program optimization are required, we need only change the affected area. *NCL* will automatically rebuild any geometry associated with the change and regenerate the toolpaths. All geometric entities and subsequent cutter motions are associated."

Another reason Remmele selected *NCL* is because it allows total control for their programmers. It is especially useful in complicated aircraft parts, whereby the programmers aren't limited to simple

canned routines found in many PC based NC systems. In fact, most PC based NC systems do not offer realistic five-axis capabilities, and are often overwhelmed by the calculations required for tool offsets that incorporate angular orientation of the tool. The *NCL* system is parametrically driven, which allows the inclusion of numbers and formulas in the programming process, which in turn simplifies the creation of part families. When the parameters change from part to part, the data associated with the parameters changes automatically, so the user no longer needs to reprogram the modified areas.

### **Importance Of CAD With Manufacturing**

Recently Remmele added another NCCS product to their engineering software trove - VARIMETRIX, which comes in handy for those customers that don't have solid modeling capabilities. For example, some customers will send Remmele drawings and a wireframe of the part. As Terry Morri explains it, "By using the original IGES model, and building a solid model of the part in VX, we can develop tooling and add surfacing of the part required for machining. Since *NCL* is integrated with VX, we can take that data and develop our tool paths. We can then verify the cutter program. In turn, we can greatly impress our customers by showing them everything about their part on a monitor, sometimes with video conferencing, before we even make a cut. In particular, VARIMETRIX can read native CATIA™ files directly. This allows us to interrogate the data in VARIMETRIX and make any necessary changes before sending the data to *NCL*. VARIMETRIX's *Inquire* capability allows us to measure various model attributes, such as

*When machining large, intricate parts, the software must be reliable. That is why Remmele uses NCL and VARIMETRIX.*



distances between two surfaces or the radius of a fillet. Imported models can be quickly measured, shaded, and rotated, thereby providing an excellent data analysis tool."

### **A Post Program That Works**

Given the wide variety of NC equipment in use, it is vital that the output generated by *NCL* could handle the various machine/control combinations and complex rotary axes. In fact, Remmele has several 5 and 6 axis machines with a variety of pallet and head changers. To accommodate this vast and complicated array of equipment, Remmele relies on NCCS' universal postprocessor, *PostWorks*. *PostWorks* provides the user with an easy-to-use motif style interface for defining machine configurations and output file formats. The system automatically creates a solid model of the defined machine, which allows the user to visually verify and simulate the machine movements. Existing configurations can be used as input to create new configurations, this saves time when creating a post for similar machine/control combinations. With some 40 varieties of NC machine tools in their lineup, *PostWorks* is indeed a valuable tool to Remmele. Two programmers are assigned to the *PostWorks* program.

### **A Word About Training**

Remmele believes that an investment in training is an investment in the future of the company. Most NC programmers have ten or more years of machine shop experience and have been taught to run literally every machine on the floor. Remmele employees have always been trained to perform a number of different jobs, ever since the late Fred Remmele, himself a highly-skilled machinist apprenticed in his native Germany, founded the company in 1949. As a result, training is an ongoing integral function of the business. In addition to on-the-job training, which is part of the apprenticeship, is a core curriculum of additional in-plant training for all employees that takes upwards of 100 hours to complete.

NC programmers spend one year in apprenticeship training, which includes attending NCCS training programs. When VARIMETRIX was brought on board, a week long class was held at the Remmele facility, with instructors from NCCS brought in.

The investment in training results in a highly skilled and dedicated work force. And run down the list of today's hottest manufacturing "buzz" words, and you will find them used as a matter of course at Remmele.



Schultz. "The three new modes are 1) tool axis through a point, 2) tool axis through a curve, and 3) tool axis offset to a guide curve. These new modes shift the tilt and swivel origin of rotation to occur at the designated point or along the designated curve. This additional control is particularly valuable when access to the surface to be machined is limited. This condition is common in such parts as blisks and impellers.

"NCCS has also added an option that allows for a constant tilt to be applied to the controlling tool axis mode. The tool axis can now be modified with forward angle (lead), reverse angle (trailing), and side angle (slew). Modification of the tool axis is often necessary due to geometric constraints and frequently results in more efficient material removal."

Mr. Schultz continued by saying, "A new mode of surface violation checking has been implemented. In this mode, the surface to be machined is checked along the entire length of the cutting tool. This mode prevents undercutting of convex surfaces while allowing for a maximum amount of material to be removed. It also prevents undercutting when the tool axis cannot be aligned with the elements of a ruled surface. The combination of these new tool axis modes along with surface violation checking simplifies programming of complex multi-axis parts and yields more accurate results."

**PostWorks To Be Demonstrated**

**PostWorks** is a universal 2 through 10-axis post-processor and postprocessor generator. **PostWorks** converts output from most major CAM systems into NC data files which can be used to run virtually any NC device including mills, lathes, EDMs, and CMMs. A simple Motif-style interface enables the user to easily establish machine configurations, control unit features, and output file formats. To verify your new postprocessor, **PostWorks** automatically creates a solid model of the machine and dynamically simulates the machine's movement. **PostWorks** also provides a comprehensive macro language for easy customization. **PostWorks** is proven technology used across the manufacturing spectrum and is a cost-effective replacement to existing mainframe-based postprocessors. ❖

**New NCCS Brochure**

Perhaps you have noticed the new look of our ads. We feel this campaign is important as it is a testimony to the longevity of NCCS's involvement in the CAD/CAM marketplace. Not only have we had a leadership position in 5-axis NC software, but we intend to keep it. Thus, you are assured that the NCCS software you have or purchase in the future will last well into the next millennium.

In addition, we have created a new Company brochure that brings our products and services up-to-date. Created along the lines of our ad theme, it furnishes the reader a complete overview of our Company. ❖



*It's new! For your copy of our new brochure please call Raquelle Sprague at NCCS. Telephone (714) 553-1077*



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