

## **The National Institute of Standards and Technology measures success with their OMAX® 5555 JetMachining® Center**

Headquartered in Gaithersburg, MD, the National Institute of Standards and Technology (NIST) is a non-regulatory federal agency within the U.S. Department of Commerce. NIST's mission is to promote U.S. innovation and industrial competitiveness. The NIST Fabrication Technology Division, the agency's full-service fabrication shop, has acquired an OMAX 5555 JetMachining Center to help meet its researchers' needs in conducting measurement research. The Fabrication Technology Division produces a wide variety of instruments such as ultra-high vacuum components, radiation shielding and trapping tools, instrument support structures, and standard reference materials. Since it is not a high-production job shop, many of its internal projects are unique for research and development or small-run fabrication requests.

The JetMachining Center was installed in the center of the main shop facility, closely located near precision CNC machines. At first, staff were concerned the water and abrasive materials used in the OMAX 5555 would compromise the cleanliness of the work environment and quality of their measurement work. The technicians quickly realized the equipment did not create any additional burden in the shop environment when operated properly. In any given week, the JetMachining Center normally runs approximately 10 hours. For larger projects, it can run between 30 to 40 hours a week.

NIST works with expensive raw material such as stainless steel and invar. One 3-inch thick plate can cost anywhere from \$1,800 to \$3,000. Therefore, finding cost-saving solutions to cut material efficiently becomes paramount. When they created an 800-pound weld assembly, they reused the scrap slug from the middle of a plate to cut another component piece. The group originally estimated 120 hours of cutting for this project if they only operated with CNC milling and drilling machines. But after including 30 hours of OMAX waterjet cutting, milling time was reduced to 20 hours. Using abrasive waterjet technology also eliminated heat affected zones on the metal, creating ideal conditions for quality welding.

The OMAX was employed for cutting a rolled stainless steel press brake sheet. The incrementally bent ½" sheet simulated an arc and had to be shaped before cutting; the abrasive waterjet was the only option to cut the part in that state. Another material they found perfect for cutting on the OMAX was cadmium, a toxic material too soft to cut effectively on traditional milling machines.

In an upcoming project, the NIST fabrication shop may use the OMAX 5555 to cut fired ceramic, a material harder than carbide. They plan to slice a 0.040" wide thread-like groove by cutting through the side on a tangent. The team can visualize their design with Intelli-MAX® Software and simulate the machine operation process. They have considered acquiring the Rotary Axis accessory for just such a challenge.