Robotmaster®
CAD/CAM for Robots

CASE STUDY

ROBOT PROGRAMMING SOFTWARE ADDRESSES COMPLEX MATERIAL REMOVAL APPLICATION

Client Profile:

AV&R Vision & Robotics is a leader in industrial automation, offering intelligent automation solutions to optimize manufacturing processes and to control quality. The Company has developed a broad range of expertise in enabling robots to perform complex tasks that traditionally could be performed only by humans, achieving high repeatability, increased speed and enhanced precision in such machining operations as de-burring, polishing, profiling, grinding, buffing, trimming and cutting.

The Company differentiates itself by providing highly engineered solutions that integrate in depth knowledge of the machining process for optimized tool and abrasive selection and of sophisticated robot control. Thus, it delivers not only a workcell, but an integrated manufacturing process from the simplest to the most complex of machined parts.

In the aerospace industry, AV&R's expertise has been applied to projects in the manufacturing and assembly of motionless engine structure parts, such as combustion chambers, as well as of turbine blades and other moving parts.

Context:

The de-burring of combustion chambers for aircraft engines is about as complex as it gets, requiring tracing detailed trajectories over more than 600 features, using 3 or 4 different tools on each. In 2006, AV&R designed the workcell and process for one such chamber. The robot was programmed manually using a teach pendant, a painstaking job for a team of 5 engineers that required about 900 man-hours to complete. AV&R's aerospace customers demand the utmost in repeatable high-precision machining but are also under extreme pressure to reduce new product introduction times. *"We needed to shorten the path teaching cycle; there had to be a better way"*, says François Arrien, Director, Robotic Material Removal, at AV&R.

Solution:

When his customer came back for a second workcell for a new product, Mr. Arrien invited Jabez Technologies to bring Robotmaster® into his shop. Robotmaster is a computer-aided manufacturing (CAM) software that creates 6-axis robot program code off-line, directly from CAD design files. Not only did Robotmaster promise considerable time savings, it was also compatible with robots from most of the major manufacturers, an important consideration to support AV&R's strategy of remaining free to offer the optimal hardware solution for the application, regardless of supplier.

Robotmaster®
CAD/CAM for Robots

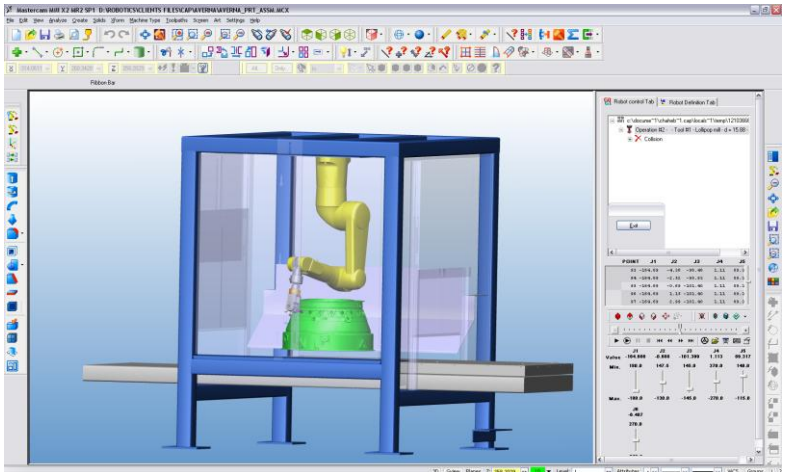
CASE STUDY

Confirmed Results:

AV&R's first application of Robotmaster was a double challenge, the team needed to integrate the use of Robotmaster into their operation on the fly, and still improve development time to meet their customer's stringent timeline. Nonetheless, even on this first use, the programming was completed in half the time, and by a team of two people instead of five, compared to the previous project. *"We expect to be able to halve the time again, for a total 75% saving, on future jobs, now that we've fully integrated Robotmaster into our development process."* Says Mr. Arrien. AV&R identified other benefits of using Robotmaster, beyond the time-savings:

- High precision and repeatability: Using conventional methods AV&R's engineers calculated the desired angle of approach or other trajectory parameters, but then depended on their manual dexterity to reproduce it on the robot using the teach pendant. Robotmaster gave the desired trajectory and positioning accurately every time;
- Simple adjustment and change: With manual programming, deciding that a 30° angle of attack would be better than the 25° already programmed, meant redoing the teach process to make the change. With Robotmaster, the engineer just re-entered the desired angle and the job was done, for all the features;
- Off-line programming: With Robotmaster, AV&R could start programming a new product for the workcell off-line, without interrupting ongoing production on the customer's shop floor, other than for final test and fine-tuning. New product introduction has become a parallel rather than a sequential operation;
- Better utilization of skill sets: AV&R's mechanical design technicians could take on robot path programming responsibilities, using the CAD/CAM tools with which they are skilled. Ultimately, AV&R expects that its customers will be able to take control of reprogramming new products on their installed workcells on their own.

Antoine Lizotte, AV&R's Robot Programming Engineer, adds: *"Before, programming meant crawling around the workcell on all fours to guide and observe the robot motion. Now the trajectory is controlled exactly the way I planned it, working on the computer screen. Only the final tune-up of tool positioning for optimum finishing quality is done on the floor"*.



"What makes Robotmaster different from other off-line solutions is that Jabez Technologies really understands machining. They've come at it from the CNC programming world and have translated their numerical machine control experience into a robot programming tool that truly addresses the problems of complex material removal applications", concludes François Arrien.

Robotmaster is a product of Jabez Technologies. Jabez Technologies specializes in dedicated software solutions for industrial automation, manufacturing and robotics, developing applications and value added solutions in the CAD/CAM domain. **www.robotmaster.com**
Mastercam® is a product of CNC Software. CNC Software, Inc. is dedicated to providing software tools for CAD/CAM manufacturing markets.