

Virtual High Performance Machining



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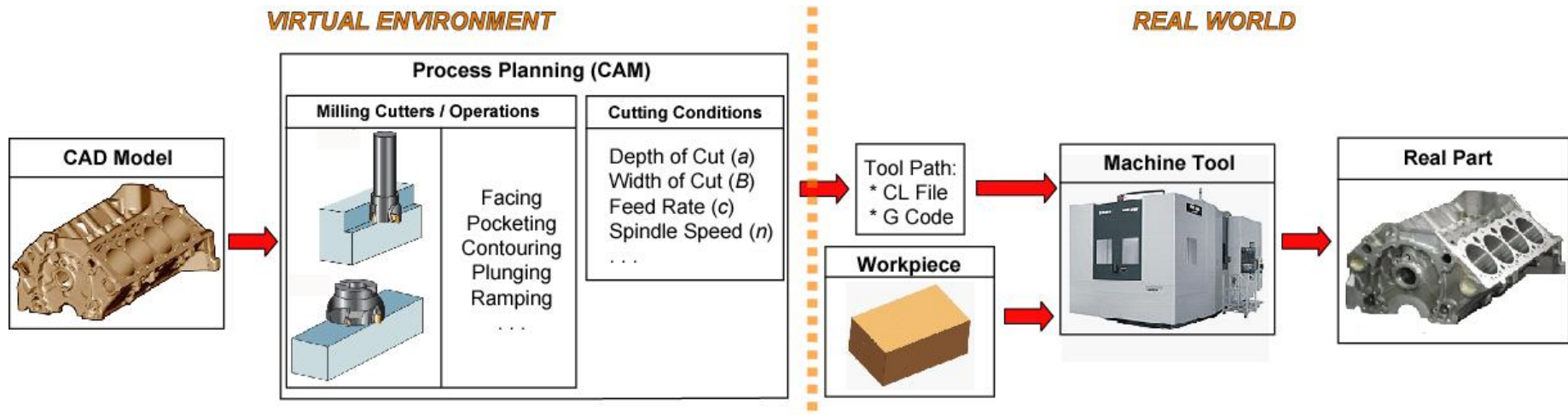
NSERC – P&WC INDUSTRIAL RESEARCH CHAIR PROFESSOR
Fellow RSC, CAE, EC, SME, ASME, CIRP, ISNM, Tokyo U., PW&C, AvH

UBC – Manufacturing Automation Laboratory (M.A.L.)

UNIVERSITY OF BRITISH COLUMBIA, VANCOUVER, B.C. CANADA
<http://www.mal.mech.ubc.ca/>



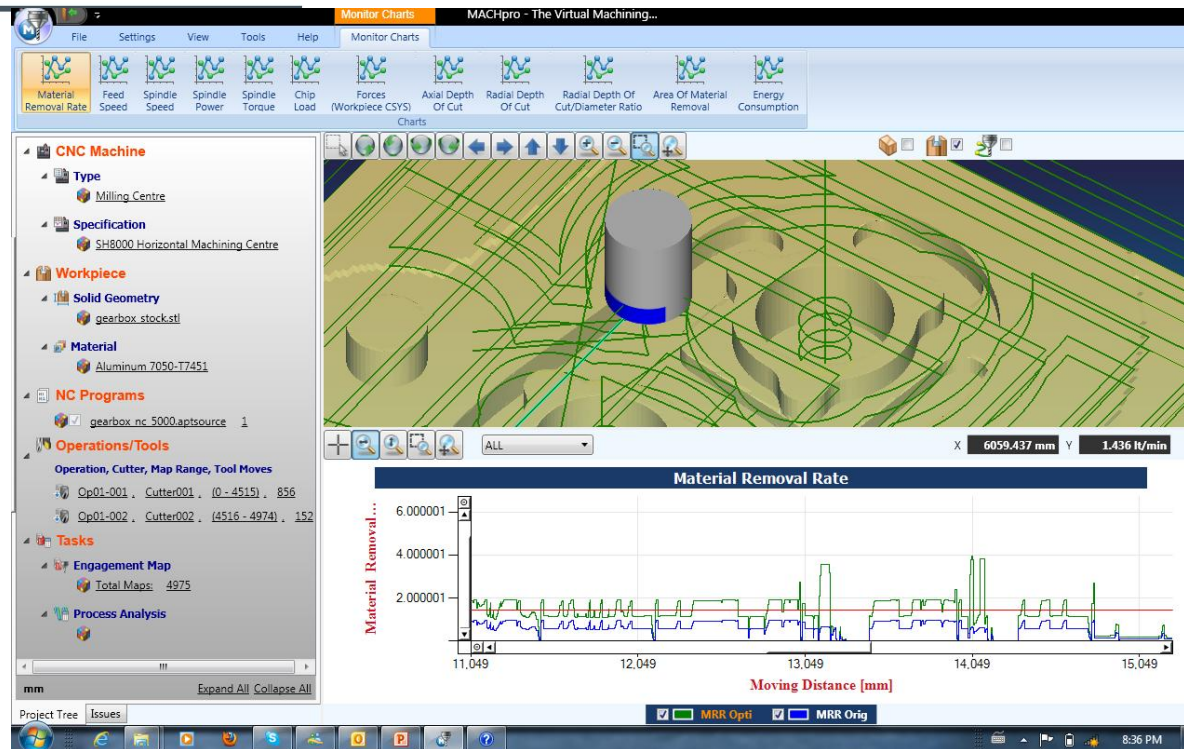
Virtual Process Simulation/Optimization



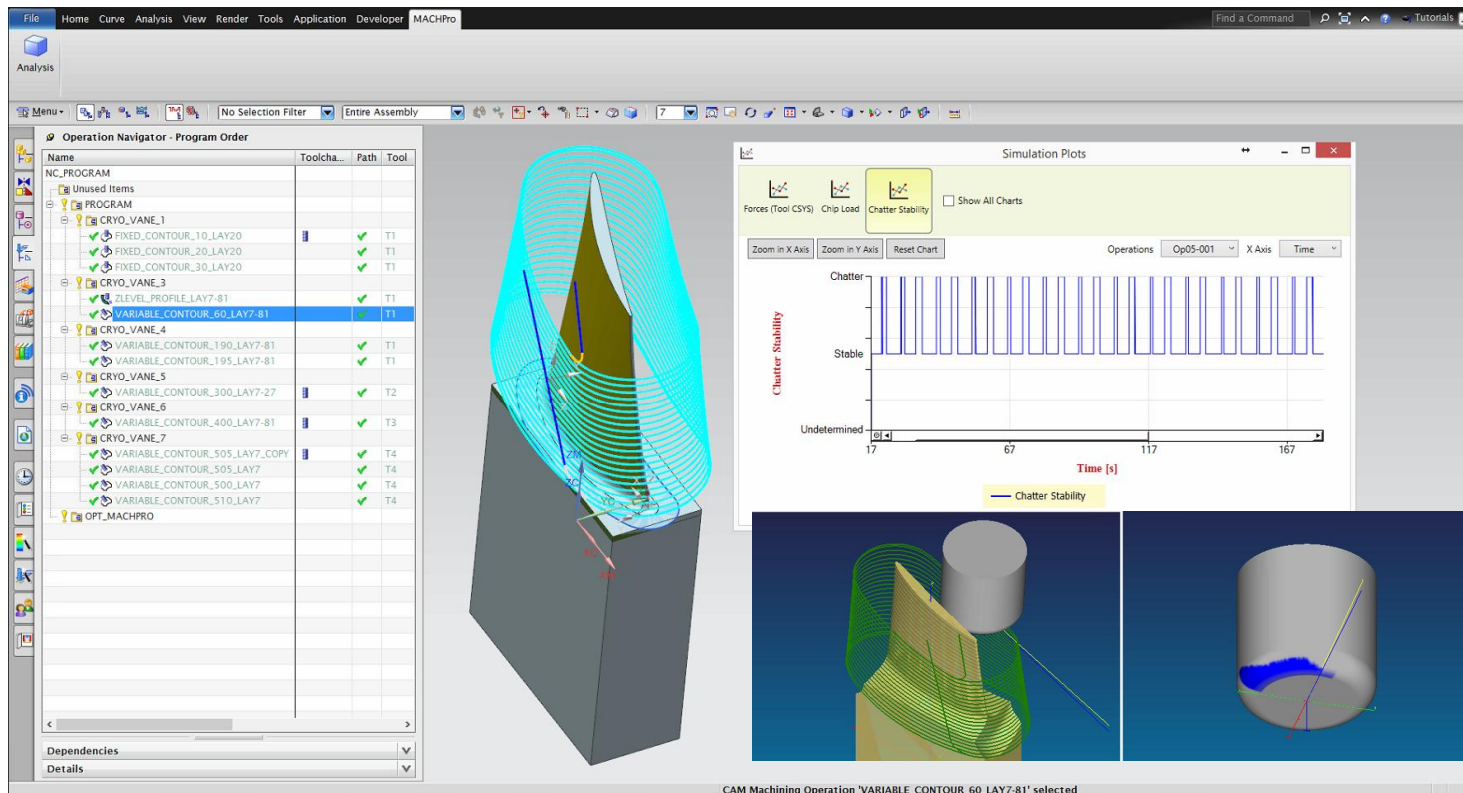
- *Machine the part correctly and cost effectively at the first trial*
- *Replace the physical machining trials by the digital model of the machining operations and machine tools*



MACHPRO: UBC's Virtual Machining Process Simulation and Optimization Platform



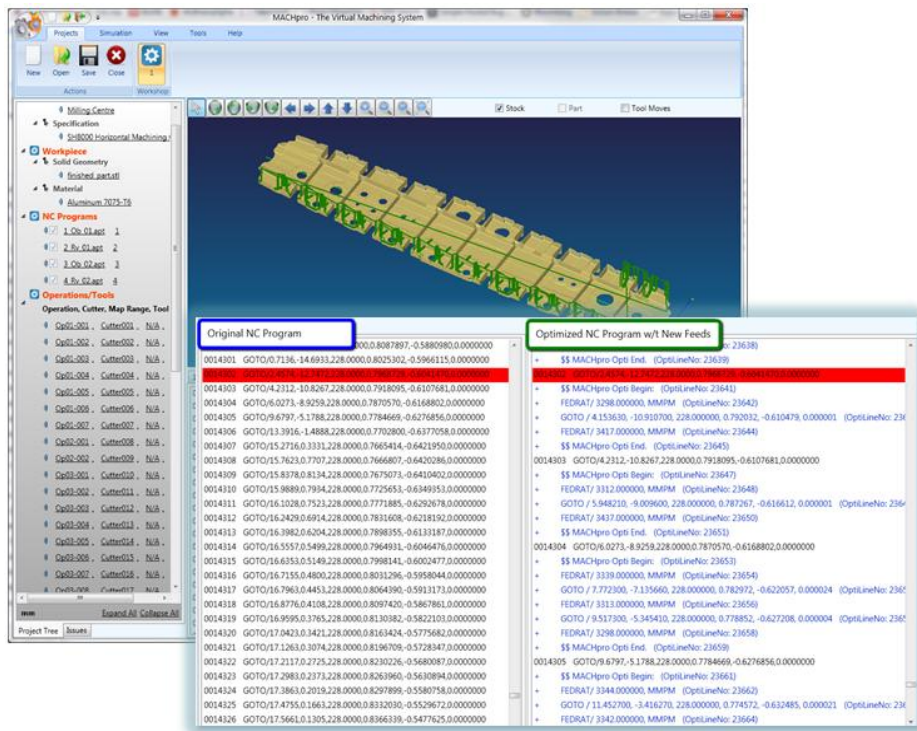
Embedded to NX CAM System



CAM Machining Operation 'VARIABLE.CONTOUR_60.LAY7-81' selected



Virtual Machining of Aerospace Parts



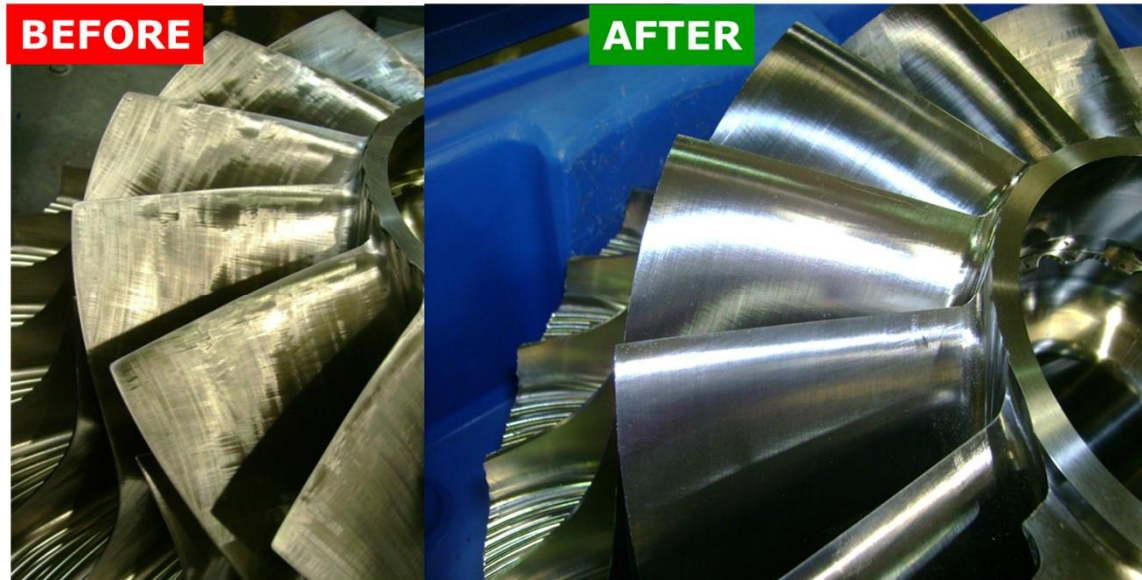
STATOR BLADE FOR A STEAM TURBINE Material: Stainless Steel	MACHpro Productivity Improvement
Blade Roughing – Stage 1	↑ 39%
Blade Roughing – Stage 2	↑ 31%
Blade Roughing – Stage 3	↑ 14%
Semi Finishing – Stage 1	↑ 72%
Semi Finishing – Stage 2	↑ 48%
Overall Productivity Improvement	↑ 57%



Impeller Milling UBC + P&WC NSERC Chair



Cycle Time Reduction: 62%



Surface roughness improved by 8.4 fold



Sample users of our technology



Research Partnership with Global Aerospace Industry



- Major aerospace companies use our machining process simulation and optimization tool box
(P&WC, P&WA USA, Boeing, Bombardier, ASCO, Embraer, Airbus, GKN, MHI, IHI, Aikoku, Kawasaki, Irkutsk, TAI, TEI, Snecma, AIDC.)
- UBC trains their manufacturing engineers to understand the engineering principles.
- Aero industry raises new problems when they use UBC technology. New problems are brought as research projects to UBC.
- After solving the problem, we integrate the solution to our software and provide it to the industry.



Technology Transfer from MAL Inc.



- Train manufacturing engineers of the company in one week long course at UBC
- Select an existing aerospace part with high machining time and cost with the company.
- Re-engineer the machining using our Virtual Machining Technology with the manufacturing engineer designated by the company.
- We train the engineer step by step while planning the part machining together.
- We let the company to compare the new and existing methods, and they make their decision with a low cost trial and training.



CANRIMT

NSERC Canadian Network for Research and Innovation in Machining Technology

Academic Members (7 Universities, 17 Professors)

- UBC (5): Y. Altintas (PI), H.Y. Feng, X.D. Lu, R. Nagamune, R. Vaziri
- McMaster (3): S. Veldhuis (Theme IV Lead), P. Koshy, A. Spence
- Waterloo (2): K. Erkorkmaz (Theme I Lead), M. L. Vlasea
- École Polytechnique de Montréal (3): R. Mayer (Theme II Lead), M. Balazinski, S. Achiche
- Windsor (1) : A. Alpas ; Calgary (1): S. Park ; Victoria (2): M. Jun, K. Ahmadi

Canadian Industrial Partners

Pratt & Whitney Canada, Honda Canada, Ontario Drive and Gear, CADLINK, MEMEX, Origin, Longterm Technologies, Alcoa.

International Industrial Partners

Sandvik Coromant (Sweden), Boeing (USA), Tenaris Temsa (Mexico), Danobat (Spain), ITRI (Taiwan), SIMIC (Korea).

