

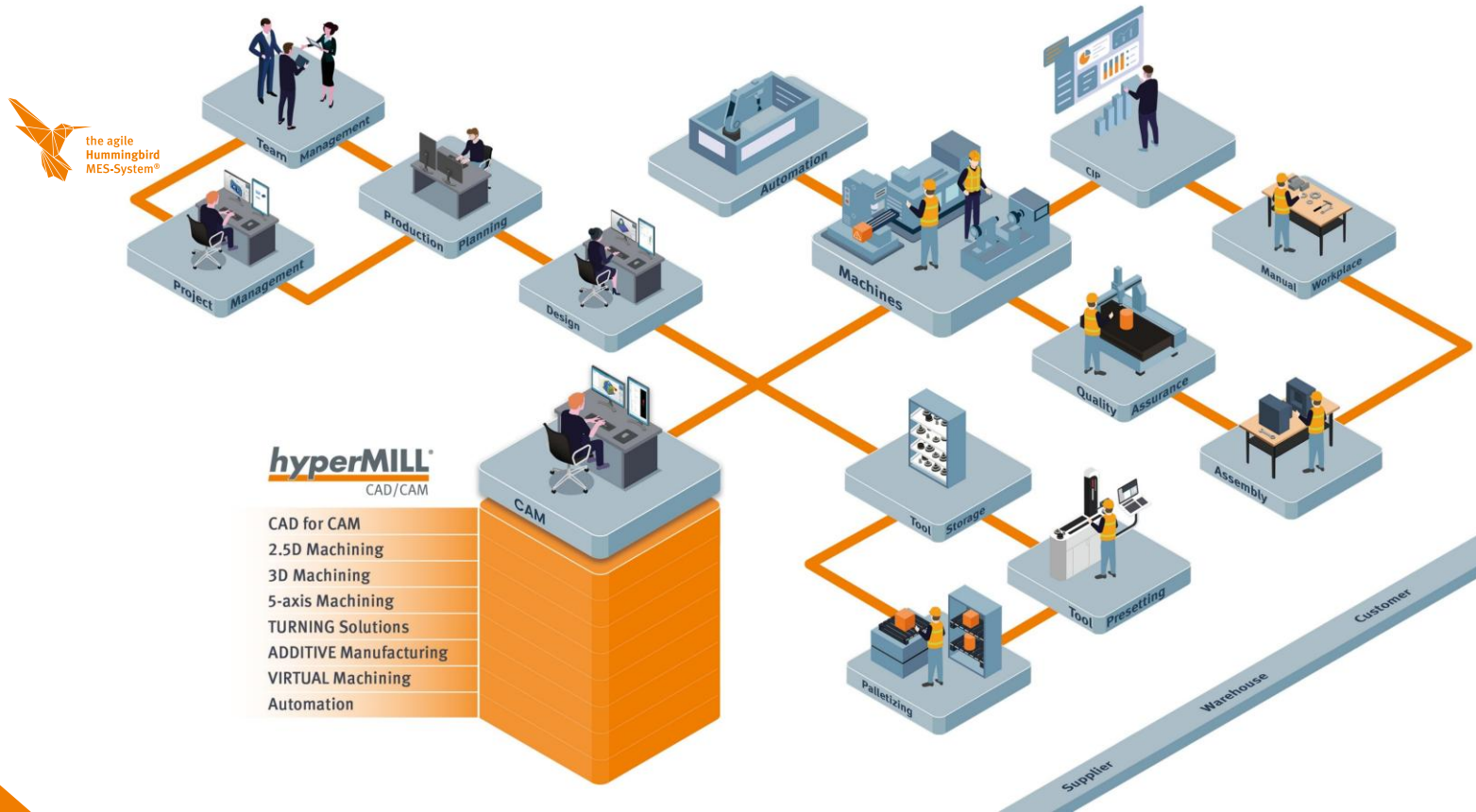


OPEN MIND

THE CAM FORCE



CREATE THE FUTURE OF MANUFACTURING TOGETHER



CAD/CAM and MES from a single source



Holistic understanding of production

Complete solution and service from a single source as well as possible connection to third-party systems



Data exchange and communication

Seamless and bidirectional exchange of all production-relevant data and information



Connected system landscape

Deep integration of CAD/CAM, virtual machine and MES for the best possible synergies



Real-time process optimization

Planning, networking, control, automation and optimization of the entire production

Content

- Introduction
- **hyperMILL® VIRTUAL Machining Center: NC Code Simulation**
- **hyperMILL® VIRTUAL Machining Optimizer: Optimized NC Programs**
- **hyperMILL® CONNECTED Machining**
- **hyperMILL® BEST FIT**

Introduction

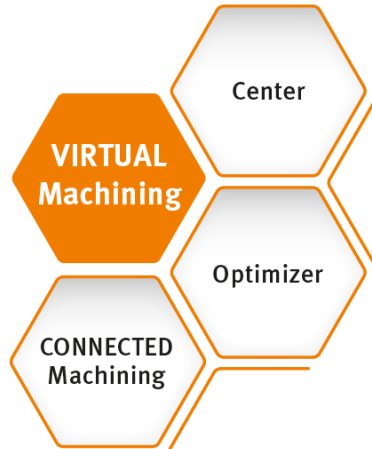
More than just a simulation solution

hyperMILL[®]
VIRTUAL Machining

Overview

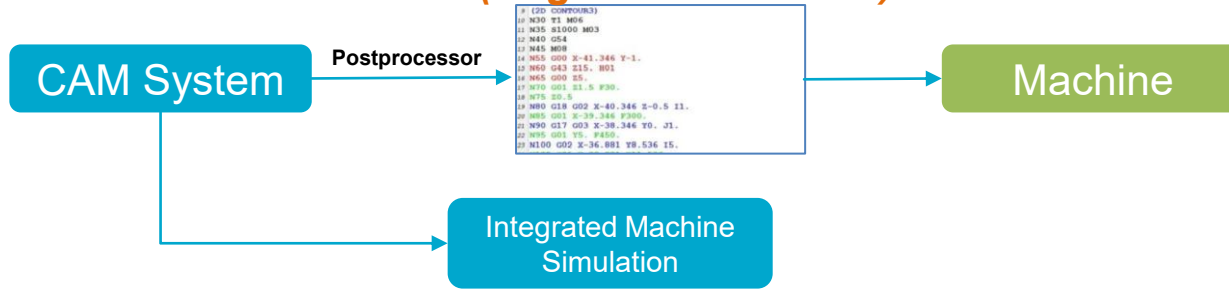
Application areas

- Creation and optimization of NC programs
- Machine checking and analysis
- Connectivity and interaction with your machine
- Job preparation: Help with machine selection and planning

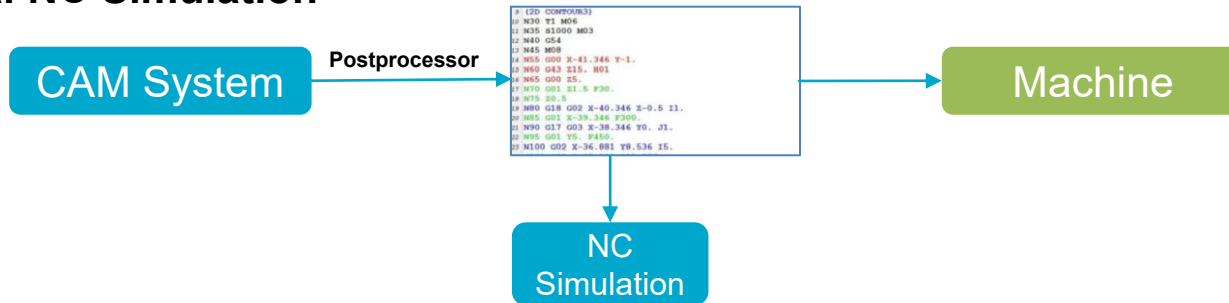


State of the Art

Integrated Machine Simulation (*Regular Simulation*)

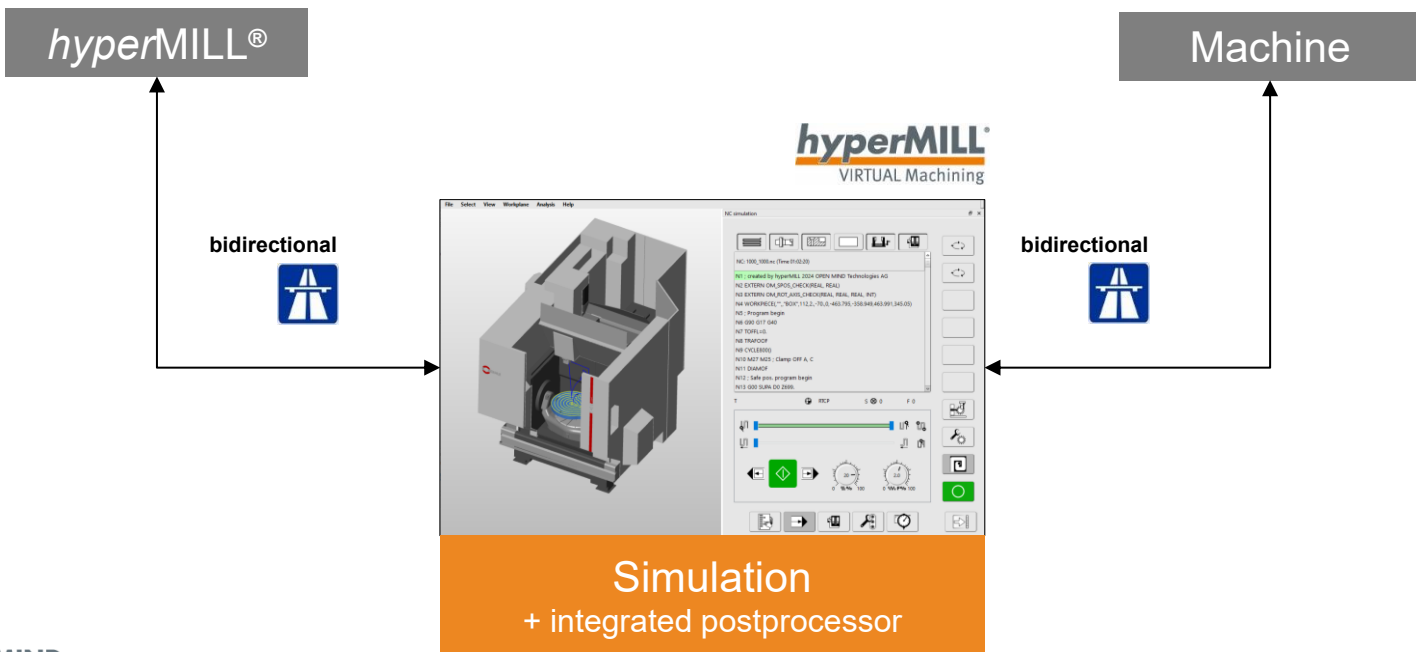


External NC Simulation



Our technology

hyperMILL® VIRTUAL Machining Center



„The *hyperMILL*® VIRTUAL Machining Center
is the key to making proof-out processes
significantly more efficient
and reliable. “

Dr. Josef Koch, CTO, OPEN MIND Technologies AG

Center

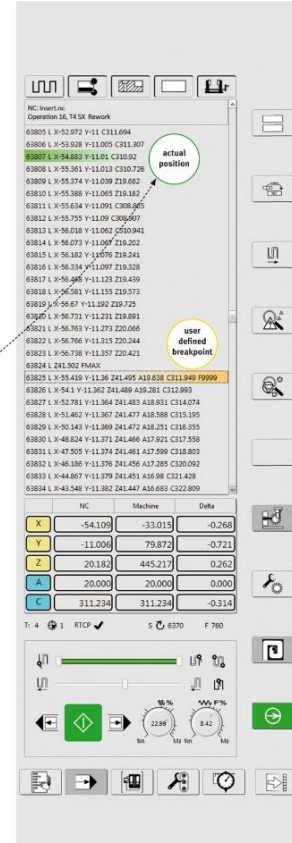
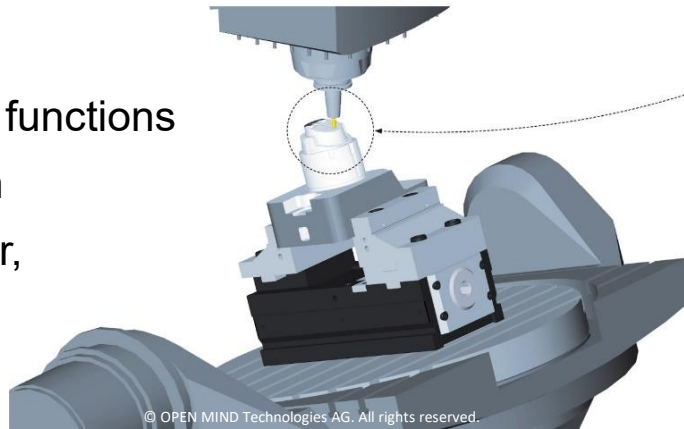
More security in NC code generation and simulation

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VIRTUAL Machining

Simulation with CAM information

Features

- Simulation based on NC code
- Based on digital twin of the machine
- Visual inspection independent of collision check
- Simulation of all tool and connection paths
- Limit switch check
- Tool length check
- Comprehensive analysis functions
- Stock removal simulation
- Check of machine, holder, tool, model and stock



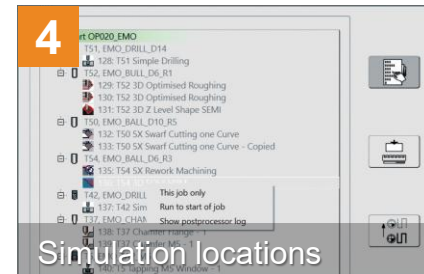
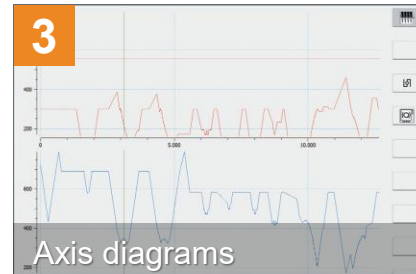
Postprocessor and Simulation

Bidirectional between *hyperMILL*®, VIRTUAL Machining Center and Machine

- **CAM information during simulation**
Clear collision check for negative allowances, bores or non-designed chamfers
- **Connection between CAM operation and NC code**
The respective CAM operation is visible in the simulation and in the NC code
- **Data transfer**
The NC program and tool data can be transferred to the controller

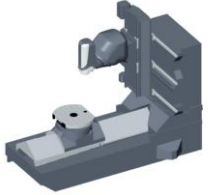
Useful functions

- **1** Workspace monitoring for all linear and rotary axes and also parallel axes
- **2** Adjust visibility of machine components individually
- **3** Axis diagrams for a better understanding of the machining process
- **4** Jumping forward or backwards to specific points in the NC code. The stock is automatically updated for the selected simulation position.



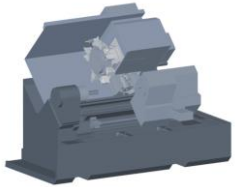
Machines and Controls

Milling



- 3-axis milling machines
- 4-axis milling machines
- 5-axis milling machines
- 6-axis milling machines
- Multi-axis milling machines

Turning



- Mill-turn machines
- Lathes

Special machines



- Additive machining centers
- KNIFE-cutting machines centers

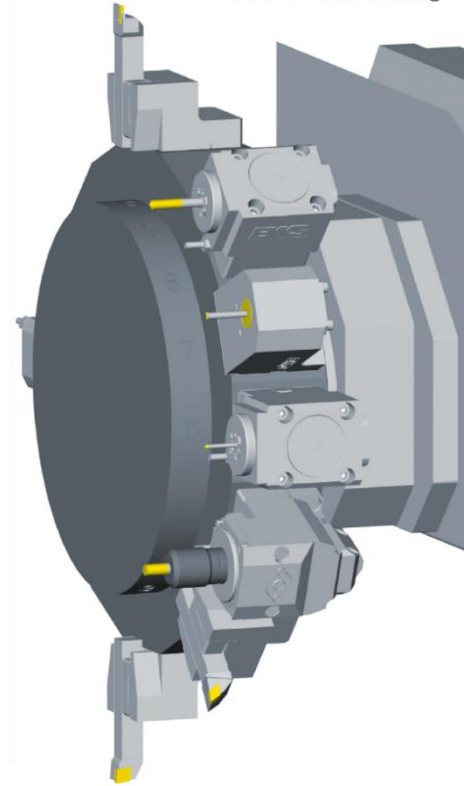
CNC Controls

- Larger number of supported controls
- Continuous development and support of new controls and functions

Turning

Precise checking is essential, especially in view of the sometimes very complex tools and holders in use as well as machining with a turret.

- One postprocessor for drilling, milling and turning
- Precise simulation of the fixtures for turning and milling operations (rotated geometries)
- Complete mapping of all holders and tools
- Easy definition of the cutting points
- Support of one turret
- Easy turret assembly
- Management of different turret assemblies



Optimizer

The optimal NC program for your machines every time

hyperMILL[®]
VIRTUAL Machining

Automatic NC code optimization

Features

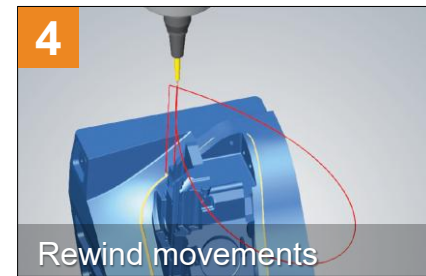
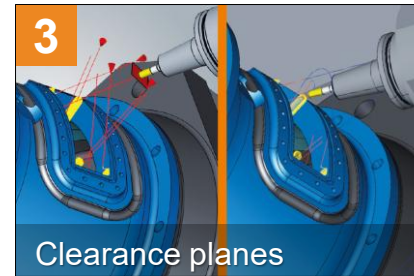
- Automatic solution change in the event of collision or axis limitations
- Automatic linking of any 2.5D, 3D and 5-axis jobs
- Milling with rotary axis
- Preferred solution selection
- Optimization of clearance planes
- Optimized movements in case of collision risk
- Automatic clearance (rewind) movements
- Automatic solution generation for 6-axis and multi-axis machines



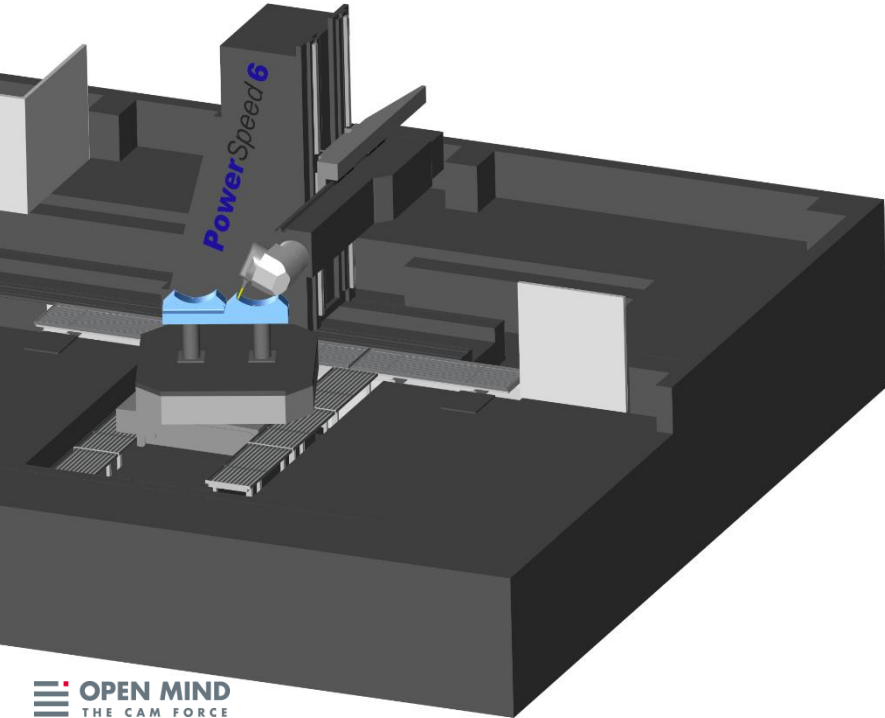
Safe and
simplified
programming

Useful functions

- **1** Automatic search for alternative solution in case of collision or axis limitations
- **2** Automatic linking movements between 2.5D, 3D and 5-axis jobs
- **3** Optimization of clearance planes always close to part for efficient machine movements
- **4** Necessary rewind movements are automatically generated



Machines with six or more axes



Easy programming and secure and efficient operation

Features

- Pre-positioning of parallel axes
- Automatic rewind movements
- Adjustment of additional parallel axes in case of limit violations
- Automatic positioning of the third rotary axis

Milling with rotary axis

Simple programming and safe and efficient operation

Features

- Axis change for 3D and 5-axis jobs
- Simultaneous machining with rotary and linear axes
- Rewind movements can be avoided

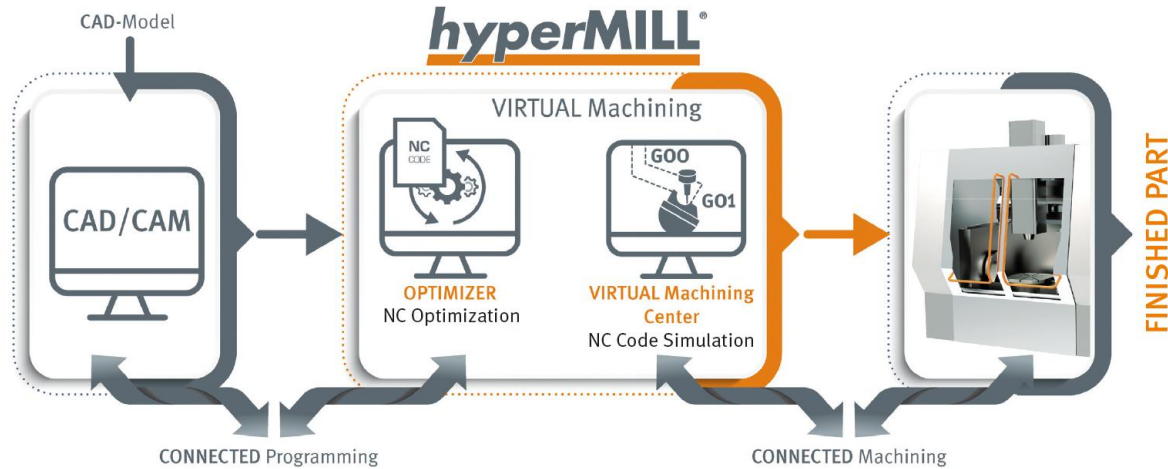


CONNECTED Machining

Connectivity and synchronization with the machine

hyperMILL[®]
VIRTUAL Machining

Connectivity of *hyperMILL*®, simulation and machine



Rely on our innovative connectivity solution for optimized workflows and maximum productivity!

Function for more safety on your machines



Zero-point alignment

The machine zero points are aligned with those of the NC program. Clamping errors or incorrect positions are avoided.



Tool comparison

Tool data from the NC program is automatically compared with the tool data of the machine. If it does not match, an error message is output and the program run is halted.



NC block synchronization

The NC block of the machine can be synchronized with the *hyperMILL®* VIRTUAL Machining Center so that the machining position of the machine simulation corresponds exactly to the actual machine position.



NC program transfer

The NC program is transferred directly to the machine controller, either into a directory structure or directly into the machine's memory. This prevents program mix-ups.



Tool information transfer

Thanks to consistent data, information originating from a tool management system can be transferred from *hyperMILL®* directly to the controller's tool memory.



Reading out alarm messages

Alarm messages from the machine are read out automatically and displayed visually in the *hyperMILL®* VIRTUAL Machining Center. This means that problems can be identified at the CAM workstation.



Remote control

Perfect interaction with the machine via PC. Programs can be started and stopped easily from the computer. The feedrate can also be adjusted while the machine is running via the *hyperMILL®* VIRTUAL Machining Center.

*hyper*MILL® BEST FIT

Part alignment with a push of a button

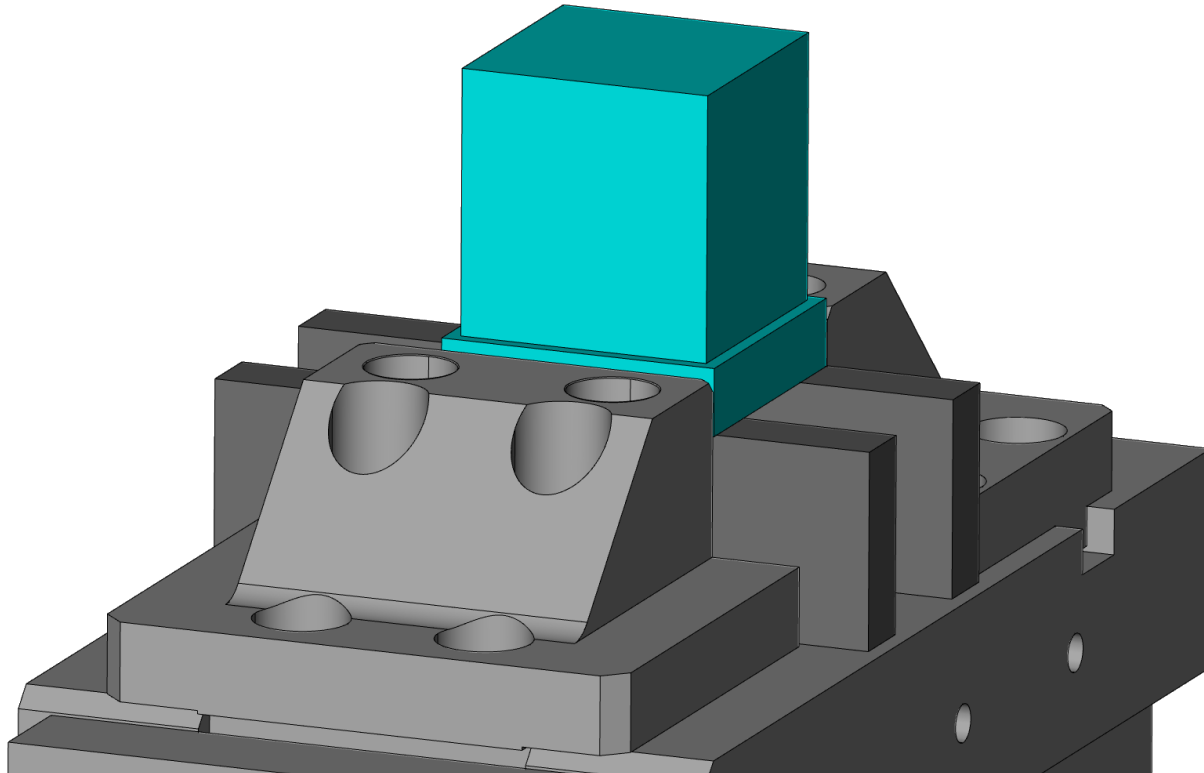
***hyper*MILL®**
VIRTUAL Machining

Real-time alignment – fast, safe, precise

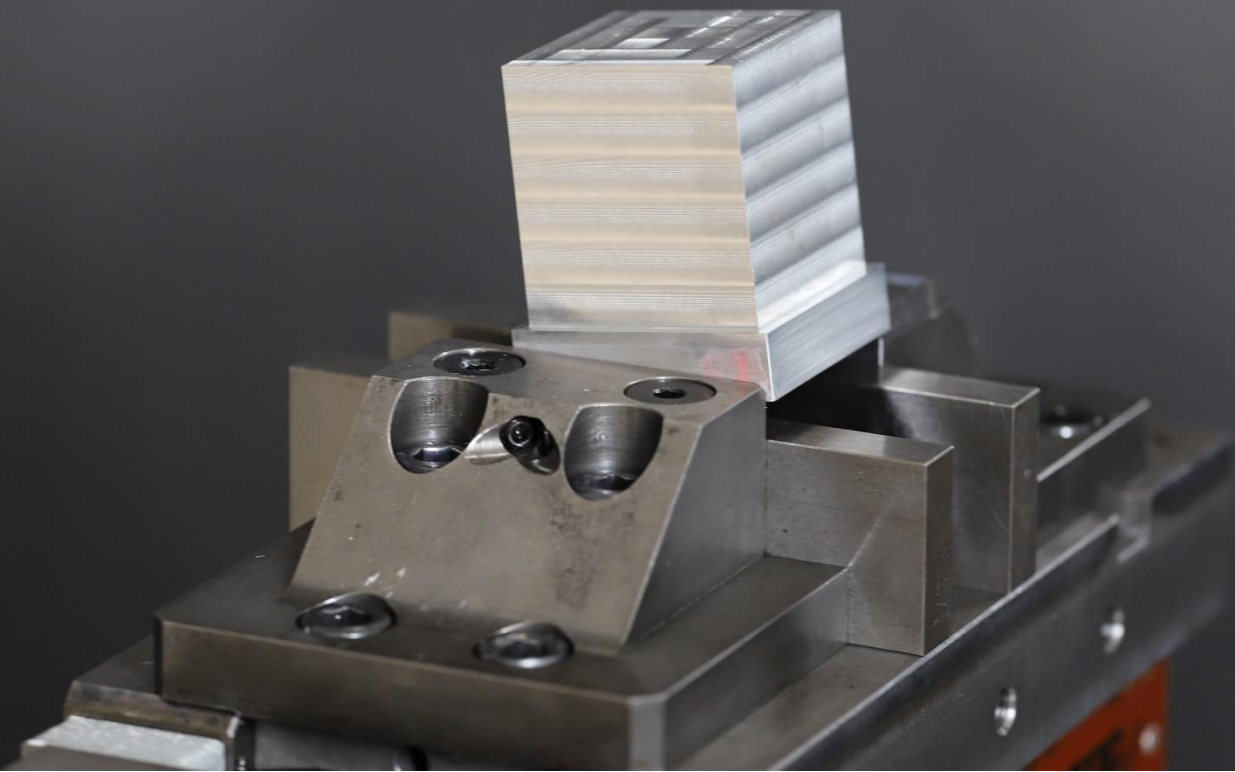
Features

- In *hyperMILL*® VIRTUAL Machining integrated
- Adjustment of the NC code to the actual part position on the machine
- Simulation and collision check with the real part position
- Optimization and transfer of the adapted NC program

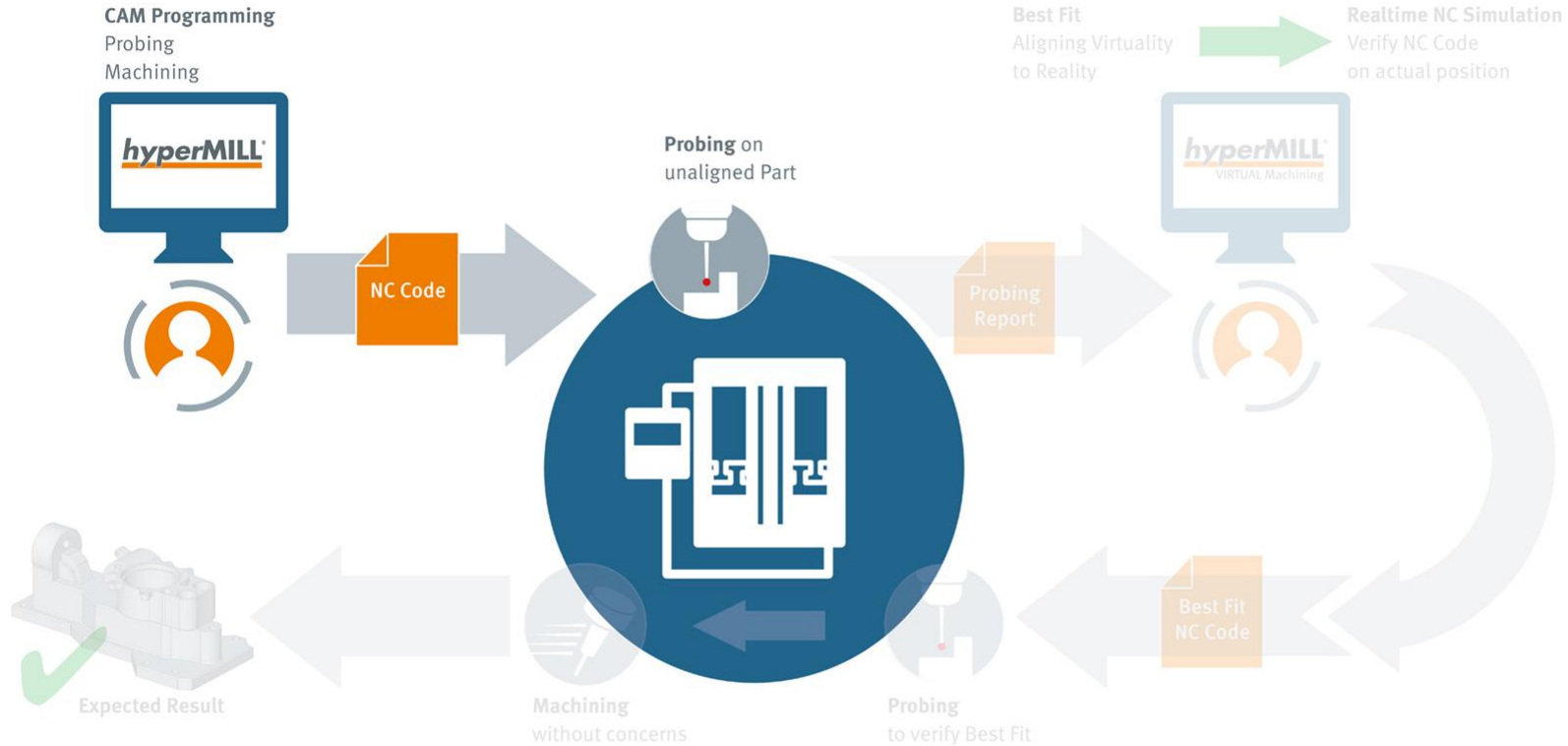
Virtual clamping



Real clamping

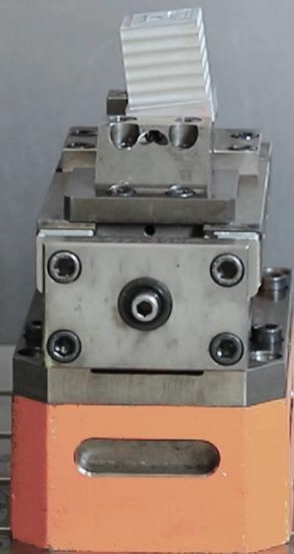


Best Fit Process

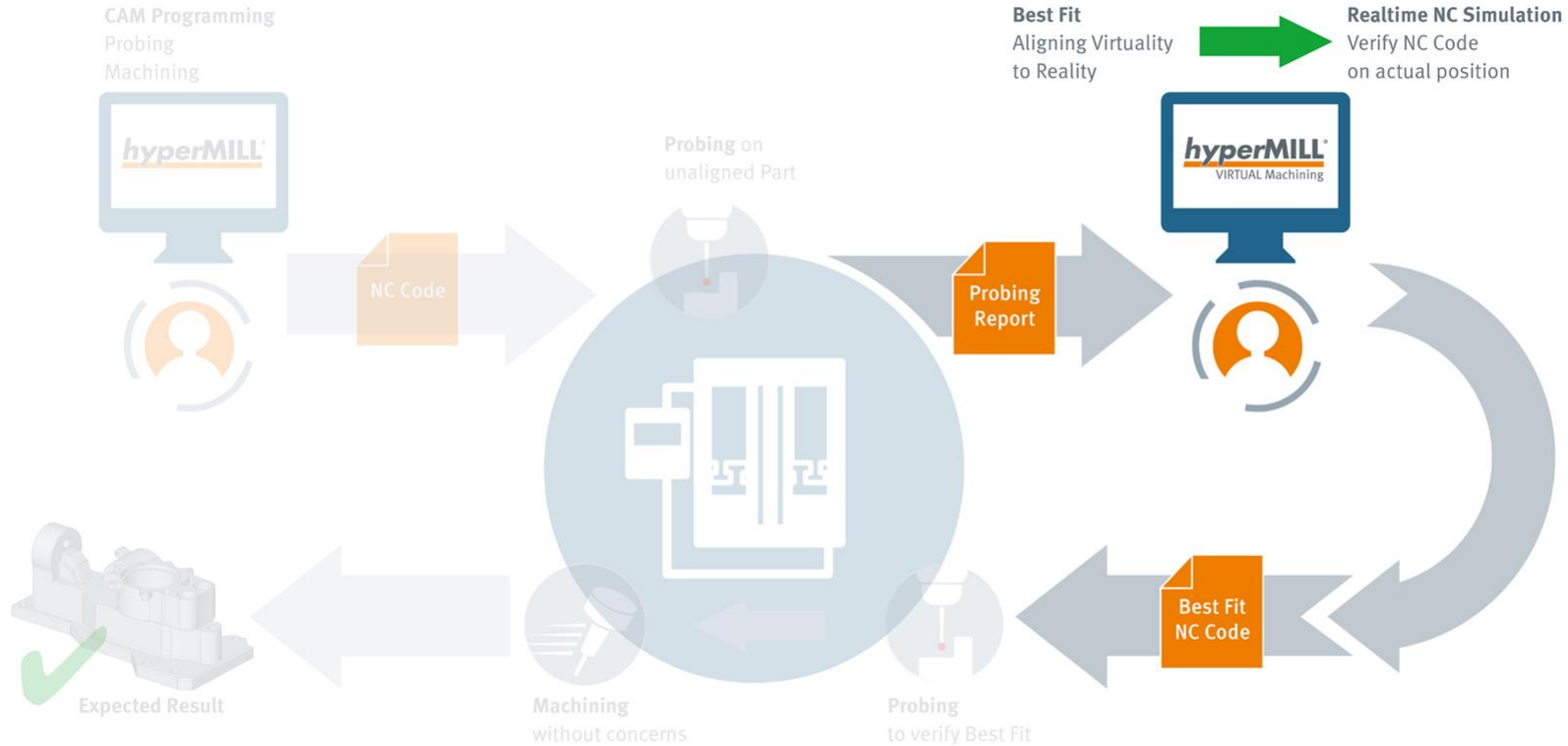


HYPERMILL

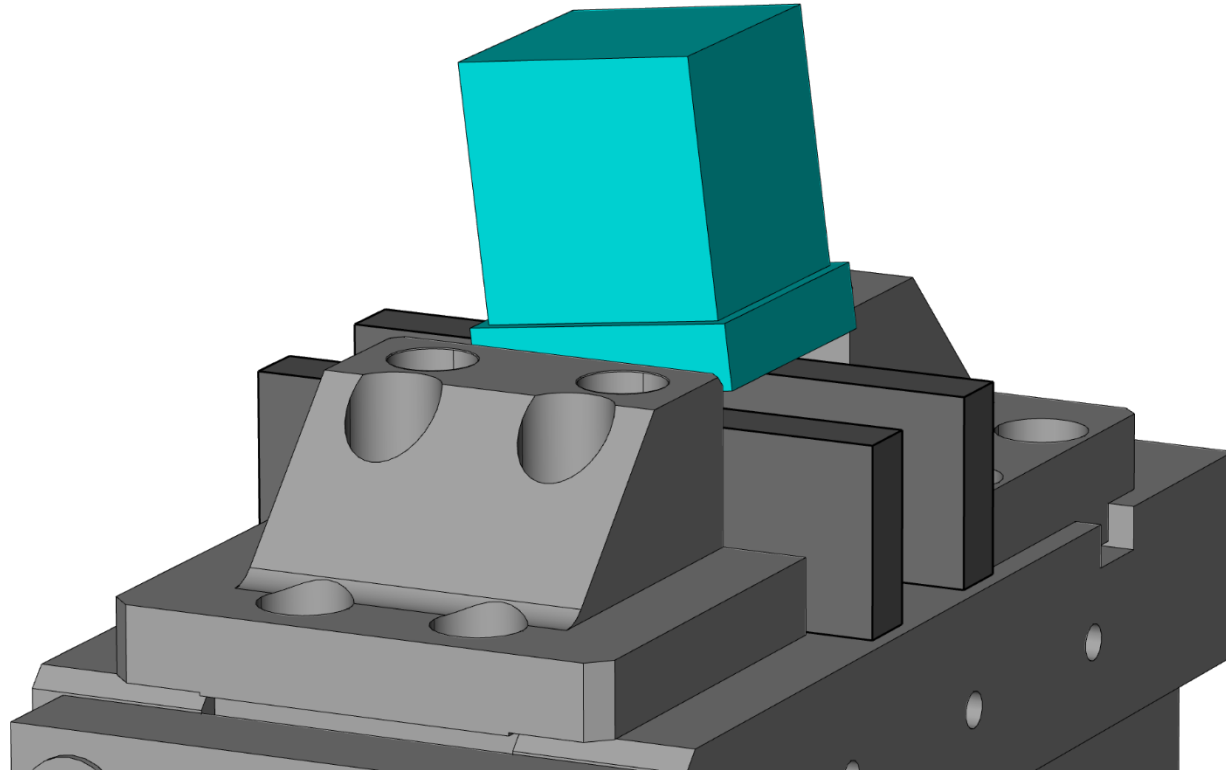
BEST FIT

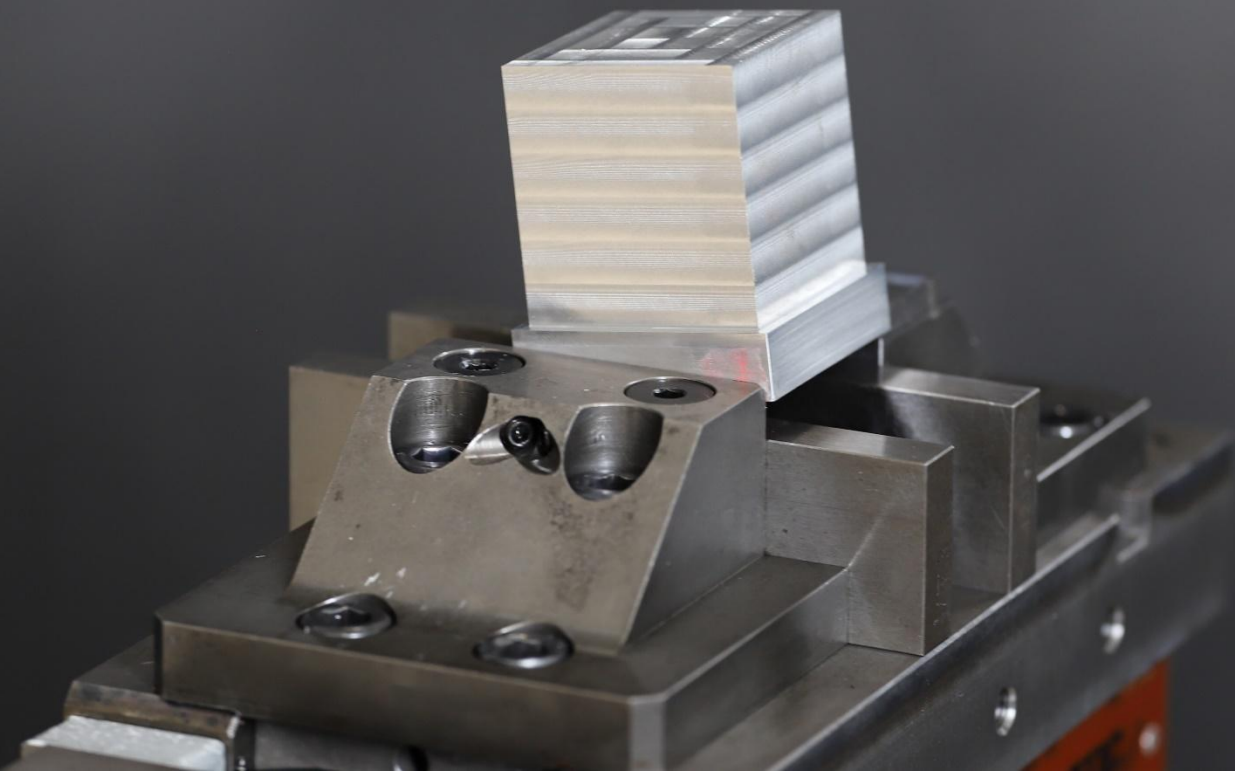


Best Fit Process

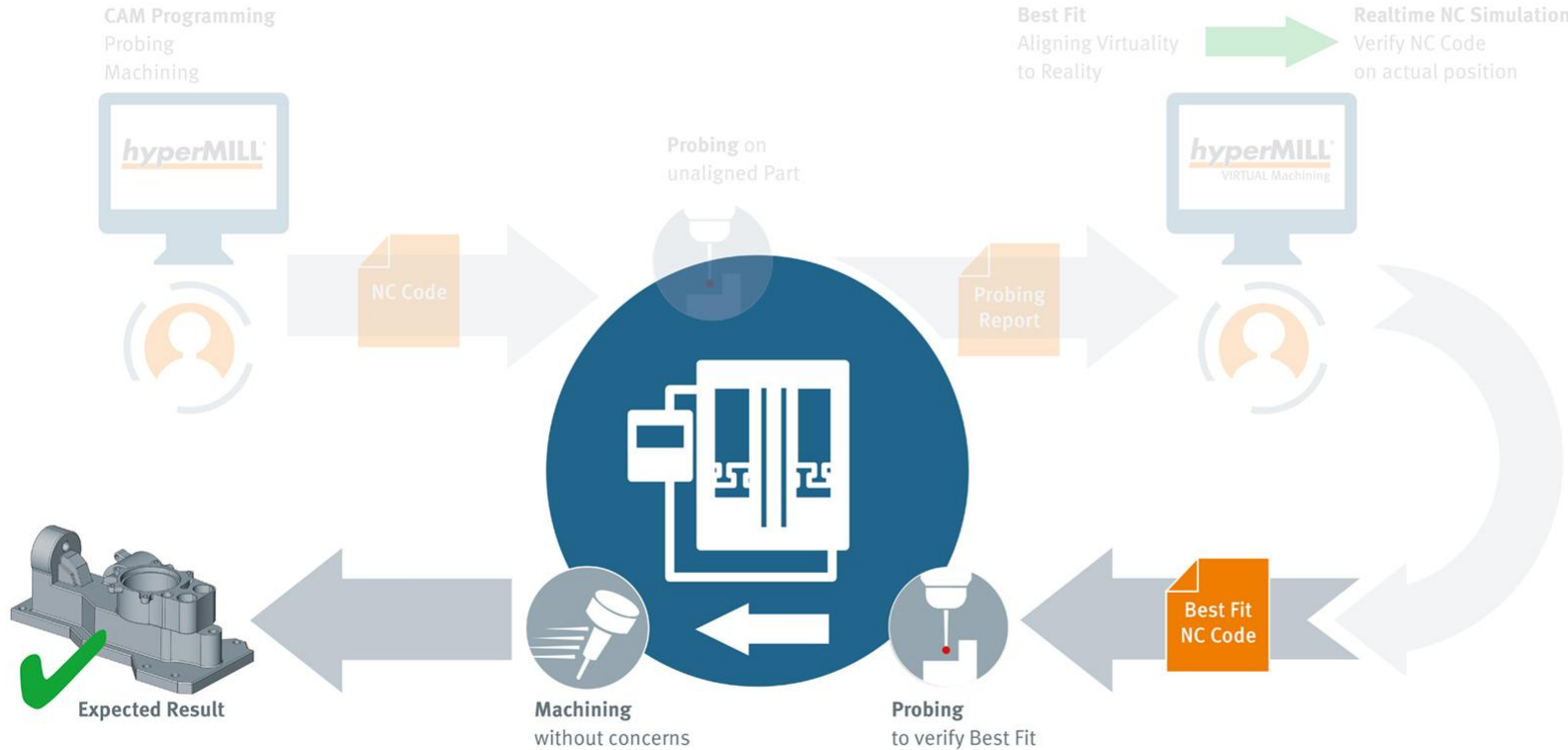


Fusion virtual world and real world



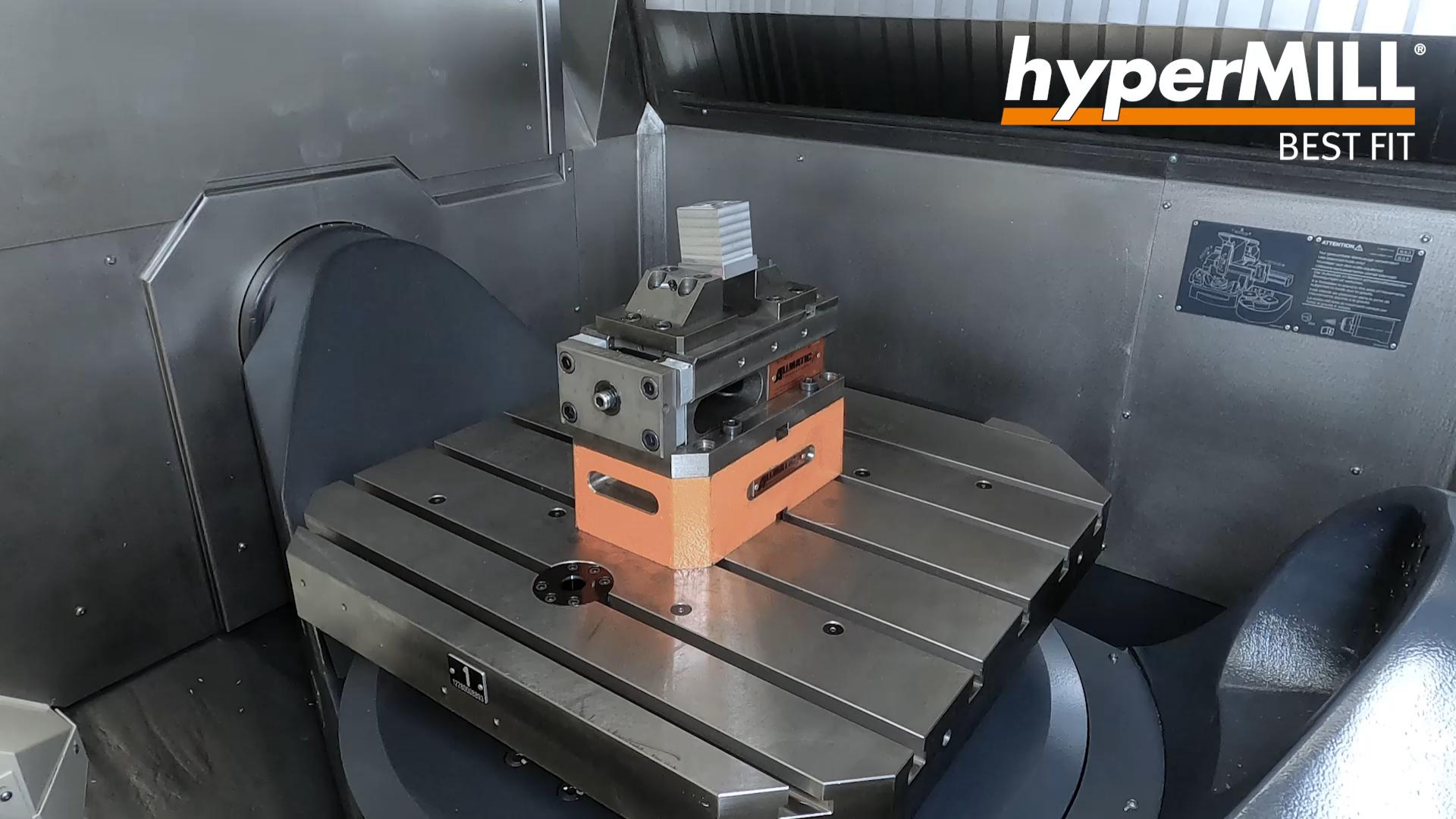


Best Fit Process



hyperMILL®

BEST FIT



Log file for alignment accuracy

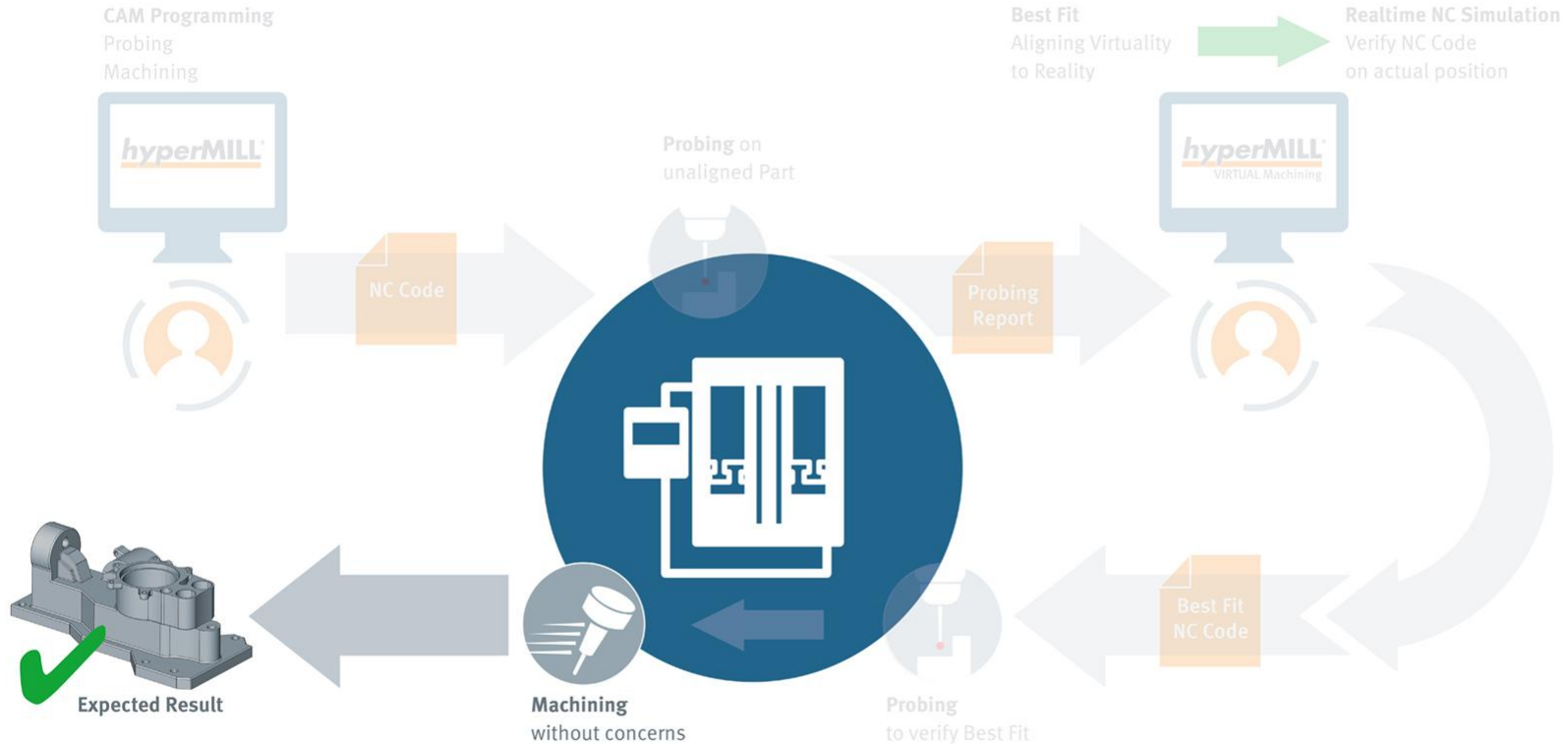
- Log file is written during verification probing
- Achieved accuracy < 0.02mm
- Out of tolerance -> machining cancellation

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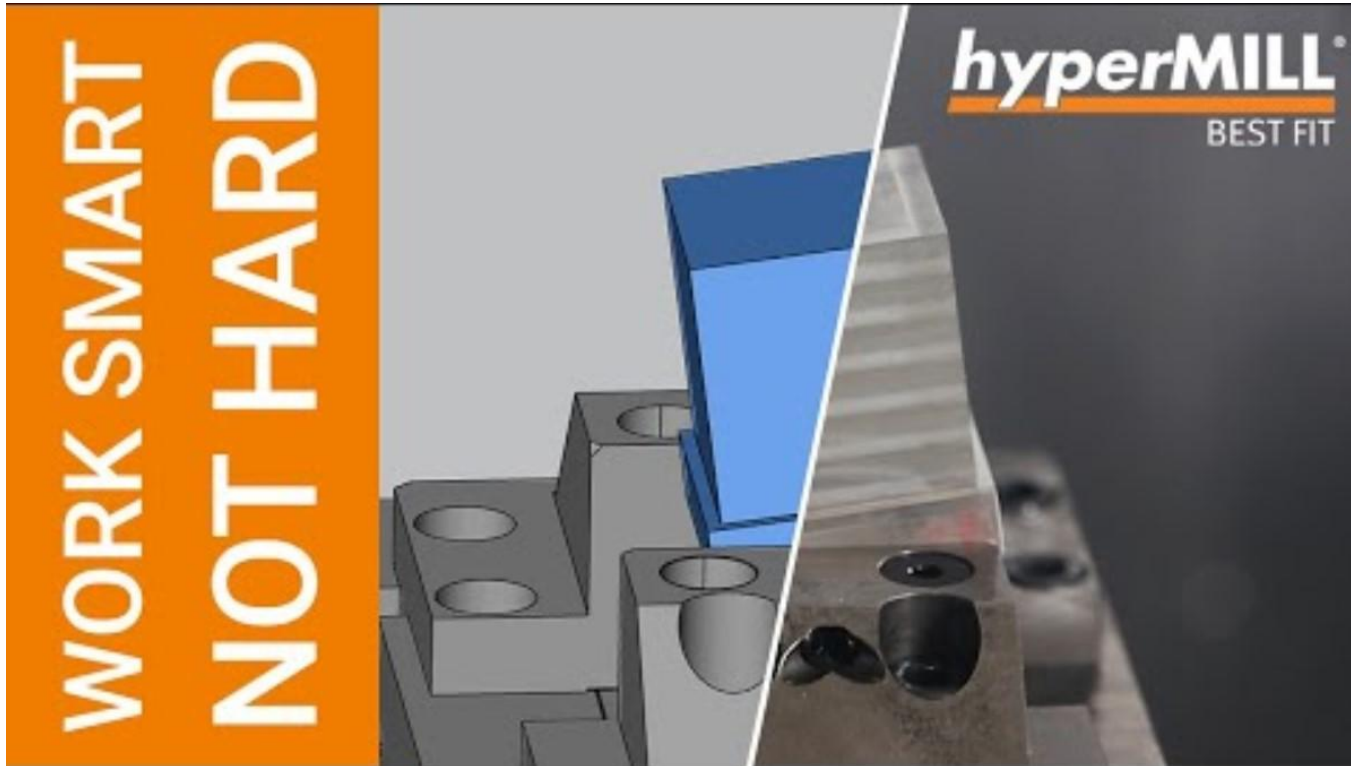
49 Job 345: T1 3D Point Probing
50 MeasureId 9 /
51 DeviationXYZ -0.0150 /
52 Tolerance -0.0200 / 0.0200 /
53 /
54
55 Job 345: T1 3D Point Probing
56 MeasureId 10 /
57 DeviationXYZ -0.0149 /
58 Tolerance -0.0200 / 0.0200 /
59 /
60
61 Job 345: T1 3D Point Probing
62 MeasureId 11 /
63 DeviationXYZ -0.0149 /
64 Tolerance -0.0200 / 0.0200 /
65 /
66
67 Job 345: T1 3D Point Probing
68 MeasureId 12 /
69 DeviationXYZ 0.0056 /
70 Tolerance -0.0200 / 0.0200 /
71 /
72
73 Job 350: T1 Slot-Rib Probing
74 Deviation Center 0.0068 /
75 Tolerance Center X -0.0200 / 0.0200 /
76 /
77
78 Job 355: T1 Slot-Rib Probing
79 Deviation Center -0.0089 /
80 Tolerance Center Y -0.0200 / 0.0200 /
81 /
82
83

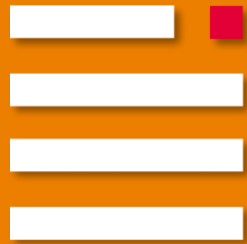
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Best Fit Process



Explained in 60 seconds





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