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PART 200 - Be Ready to Produce Production Parts Prior to New CNC Machine Delivery

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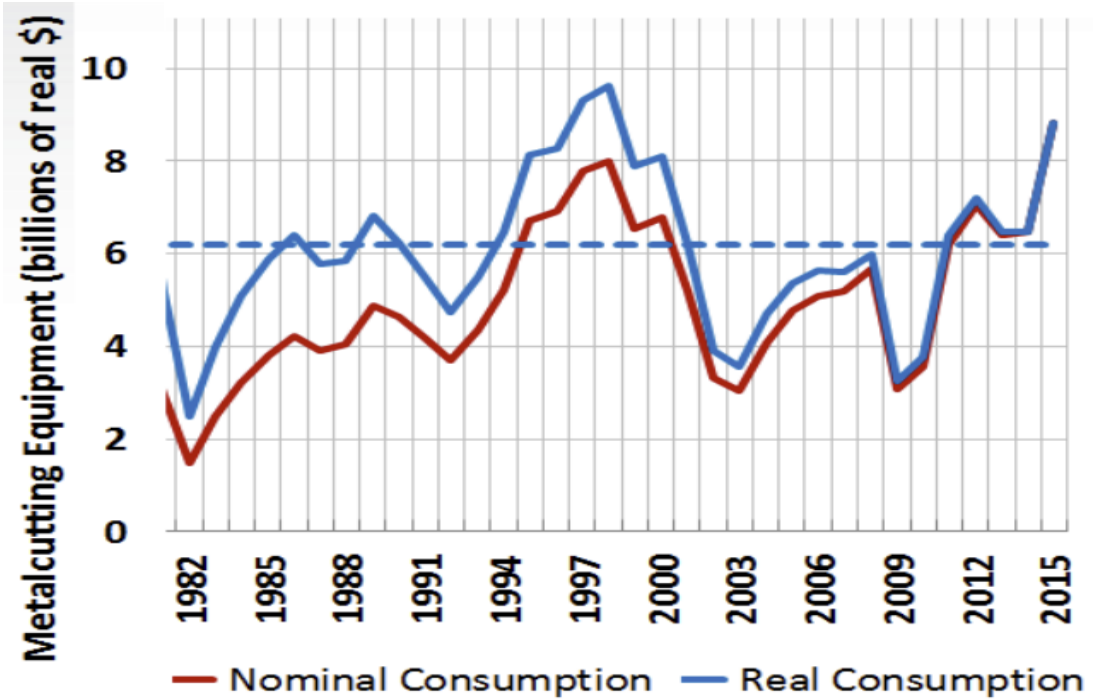
CGTech VERICUT®

Overview

- G-code driven NC simulation software can help prove out parts before a new machine has been delivered

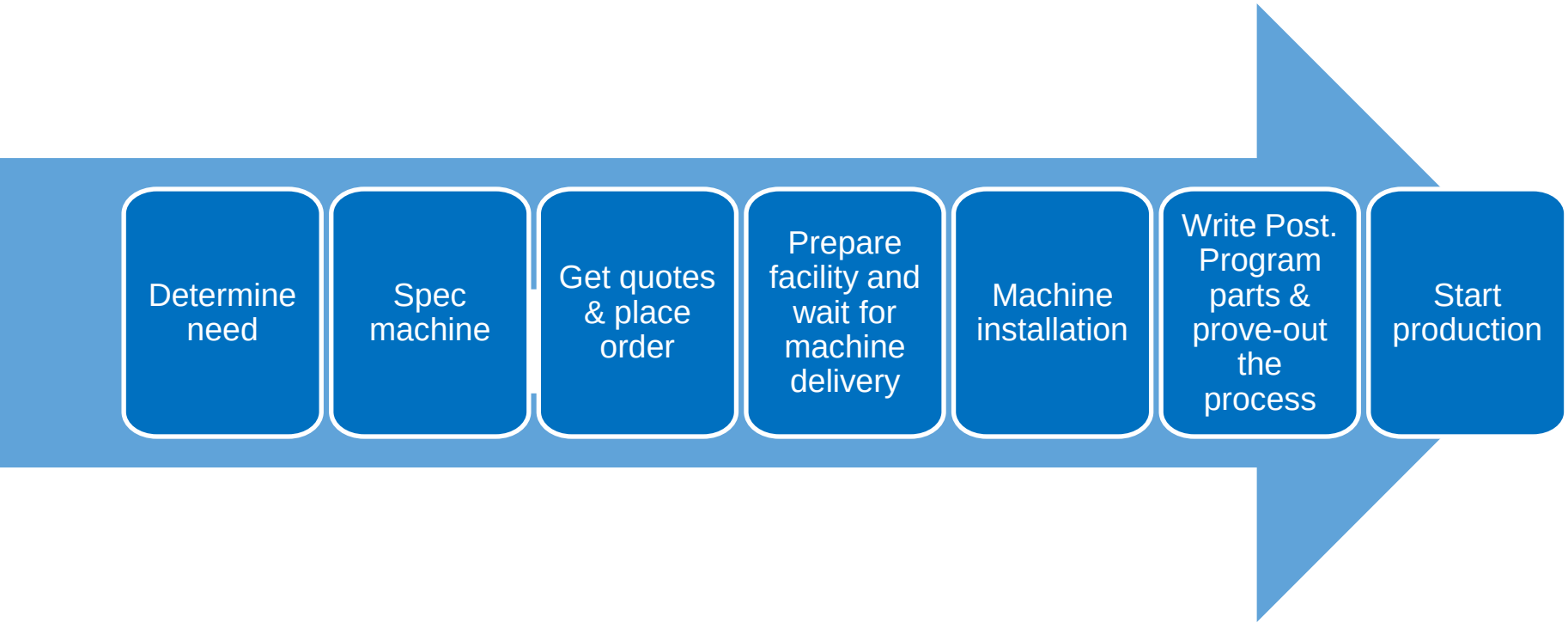
- Must determine what features are important to simulate with a new complex multi-axis machine tool

U.S. machine tool consumption is expected to increase from 2014.

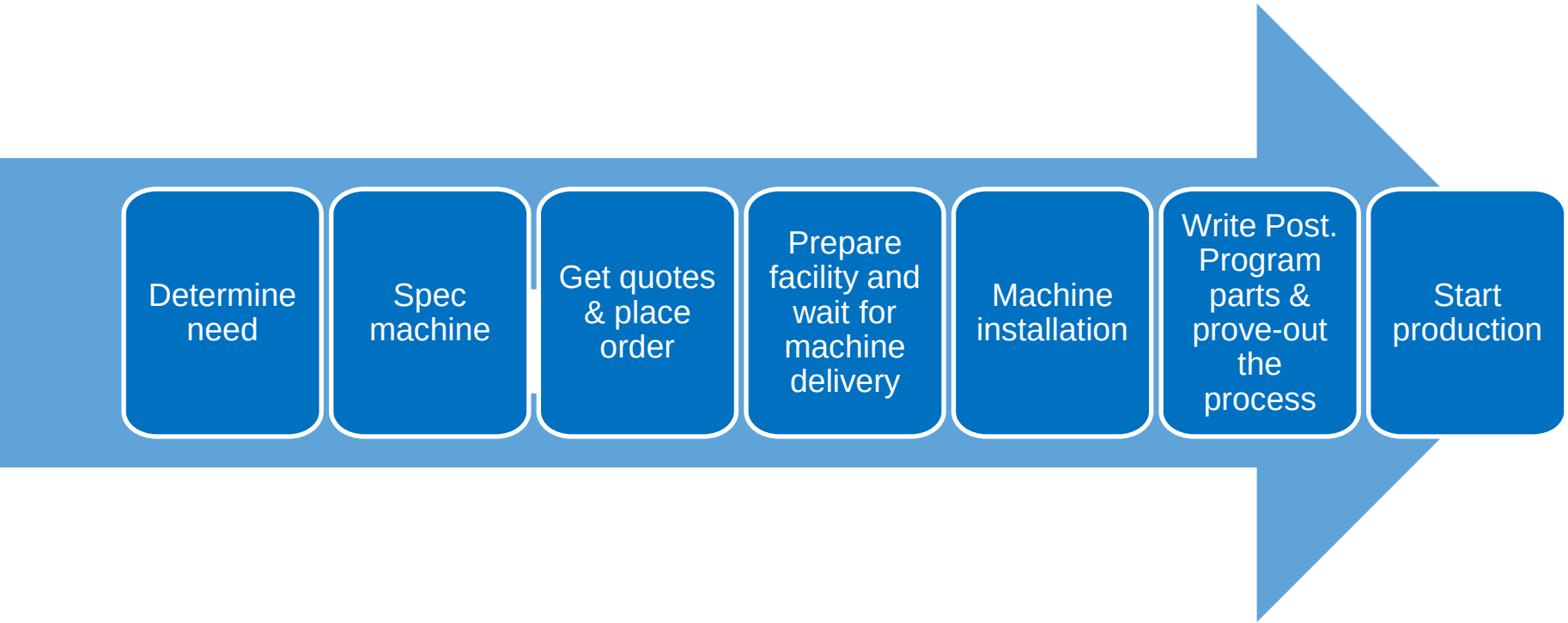


Source: 2015 Metalworking Capital Spending Survey and Forecast, Gardner Business Media

The typical machine buying process is long.



The buying process can be shortened with simulation.



Case study: **Aerospace Manufacturing Group (AMG)**

- Large machined parts, sub-assemblies and assemblies
- Ultra-high-speed mills, high-speed mills and gantries producing (up to 70 feet)
- Complex 5-axis parts with small tolerances

Case study: **Aerospace Manufacturing Group (AMG)**

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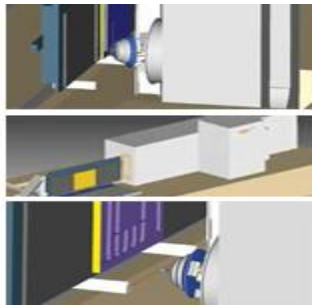
- AMG Huntington Beach orders new DST Ecospeed F-2060 in 2014
- 787-9 wing ribs for GKN Aerospace

AMG's post was debugged before machine delivery.

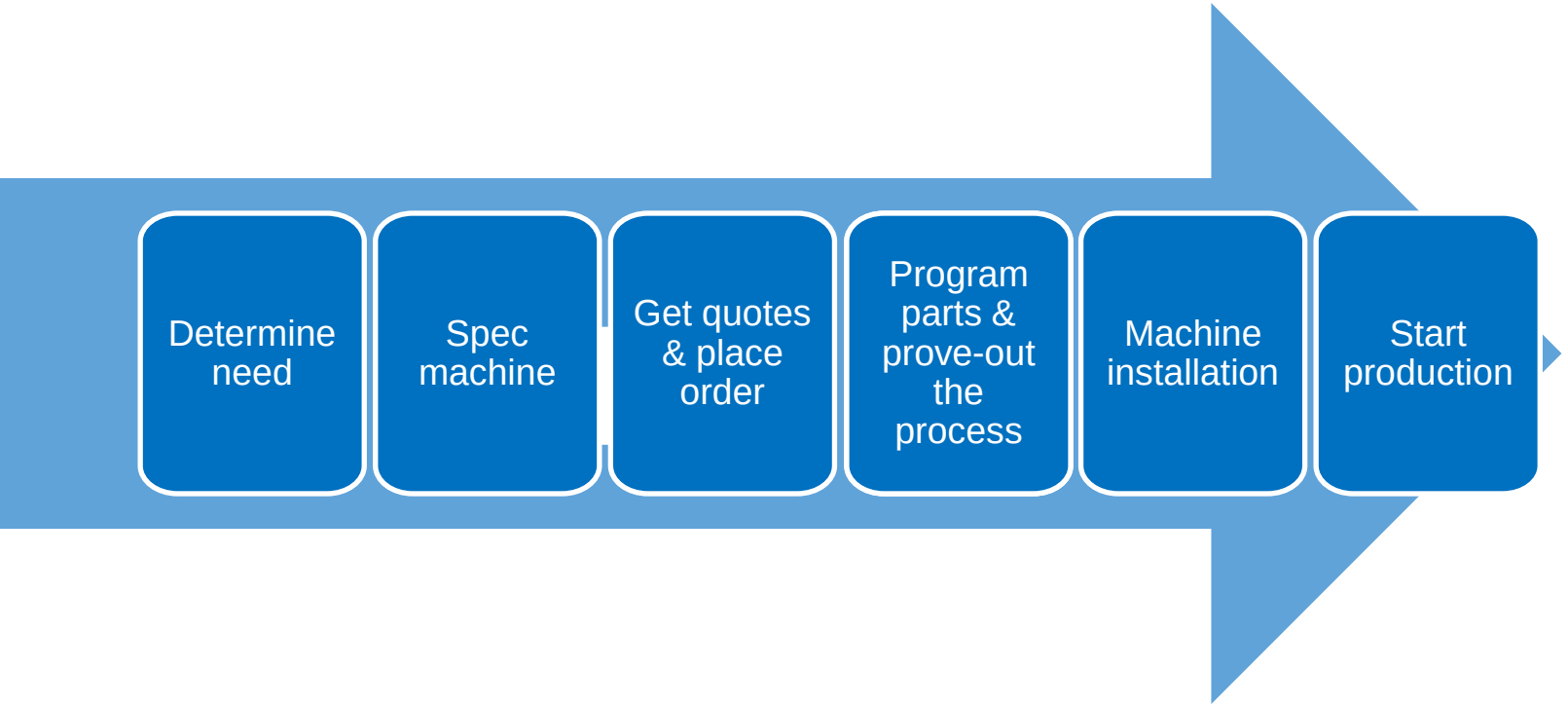
- Wrote his post while being built, and before it was installed in the shop.
- Able to debug 95% of his post before seeing the machine.
- Up and running at least a month early.



"If I made one mistake, that piece of metal was junk. So how do you deal with that stress? Simulation lets the programmer go home and sleep."

- John Gates, Aerospace Manufacturing Group

Simulation can help even in the specification stage.



Case study: **GE Aircraft**

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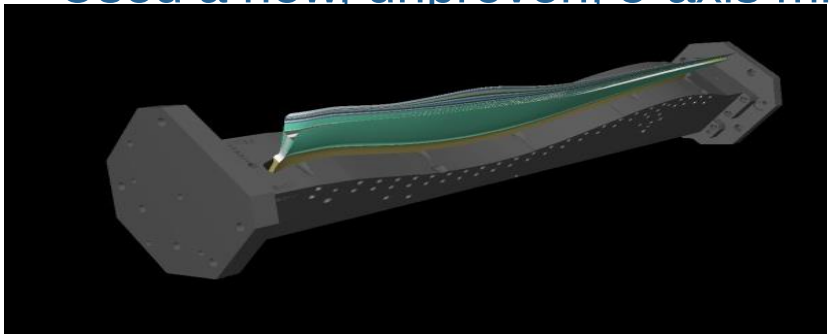
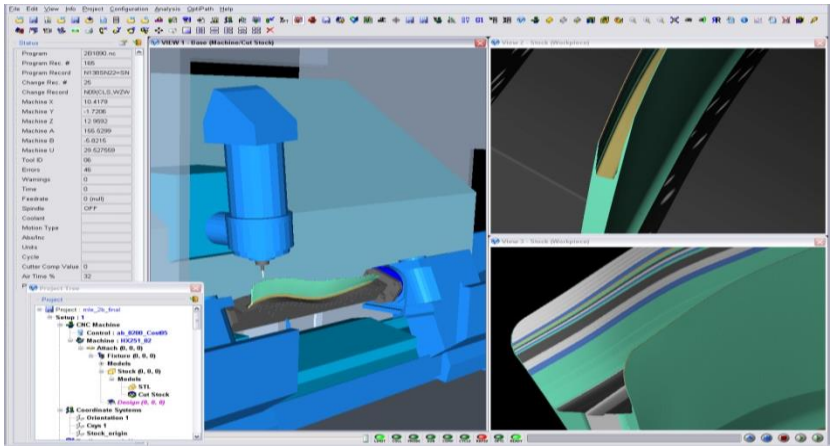
Case study: **GE Aircraft**

- R&D project
- Developed the manufacturing process for the titanium leading edges for composite fan blades
- Used a new, unproven, 5-axis millir



Simulation proved an R&D idea was possible.

- Starrag heckert 5-axis milling machine
- Machine, fixtures, and tooling had to be tested
- Process was repeated hundreds of times
  - Not possible on actual machine
- Simulation showed it could be done
- Used video to show management



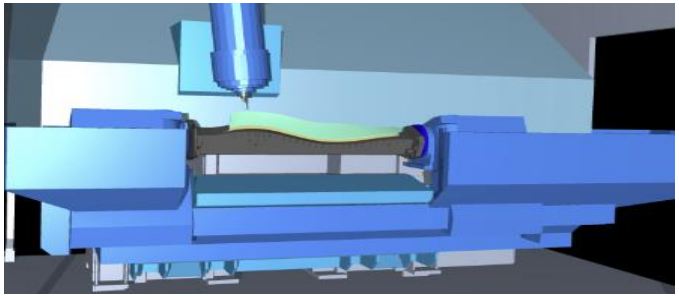
A machine was designed around the optimal process.

- Used simulation to modify virtual models of an existing Starrag heckert machine

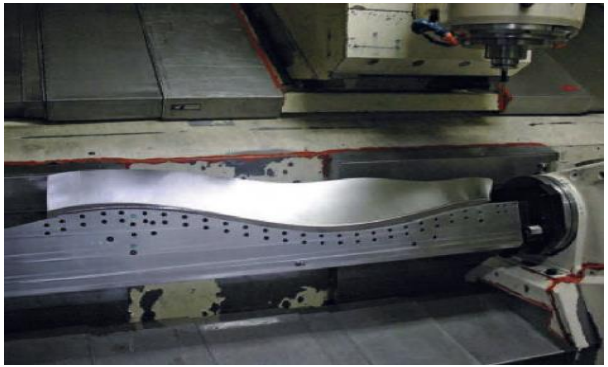
“VERICUT allows us to test the latest machine technology without having the actual machine in place.”

Simulation models were sent to the machine builder.

- Starrag heckert delivered a custom-built machine based on the simulation models



Without simulation “we would have been forced to buy the identical machine that we proved the process on – not the machine best suited for our process.”



100% confidence in the simulation is required.

- If there is any doubt, prove-outs will be required.

There are specific simulation features to look for.

- Easy to use, but robust capabilities
- Fast and accurate
- Must simulate from the same code that will be run on the machine (g-codes)
- Cut stock must match final output

Common Verification Technology

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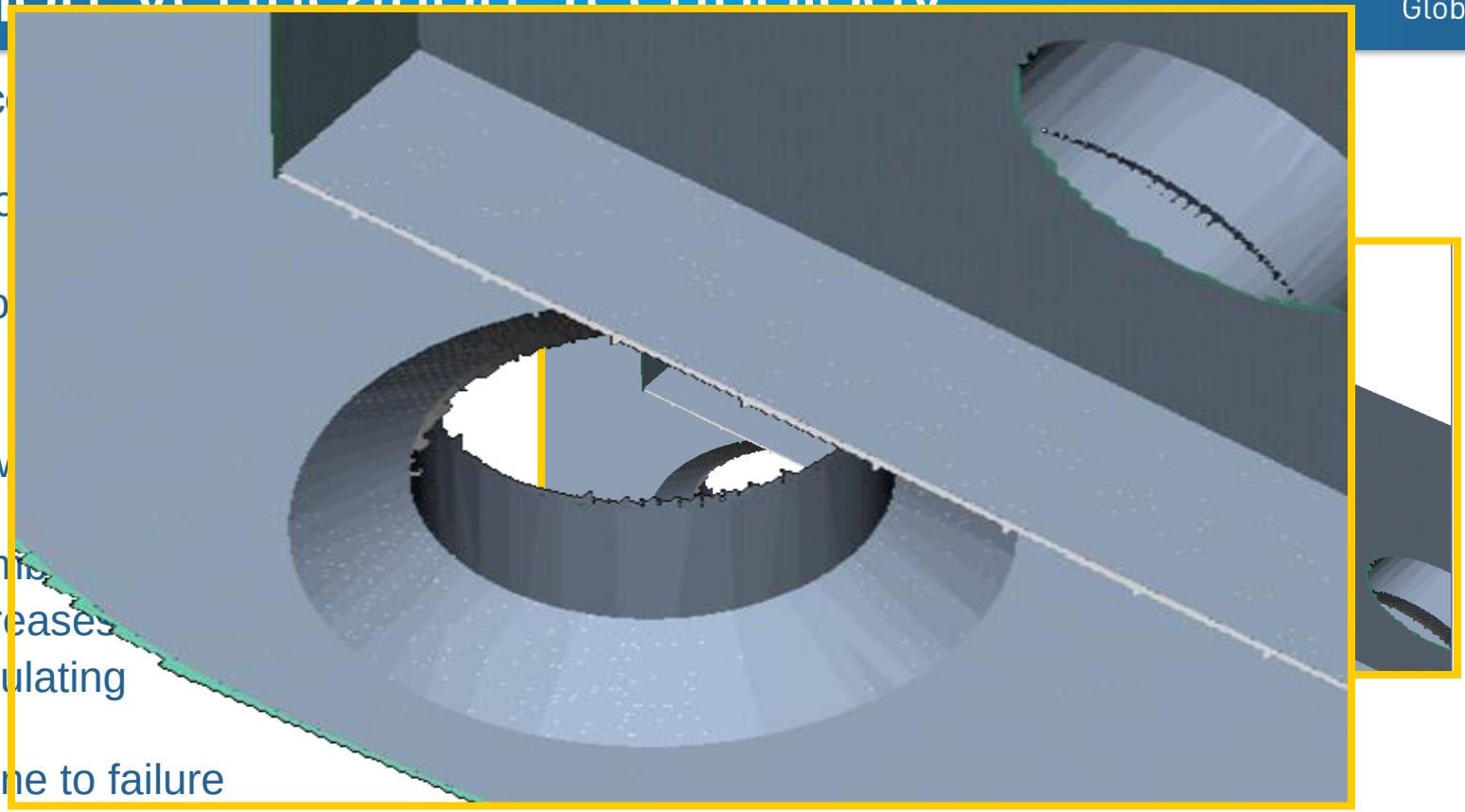
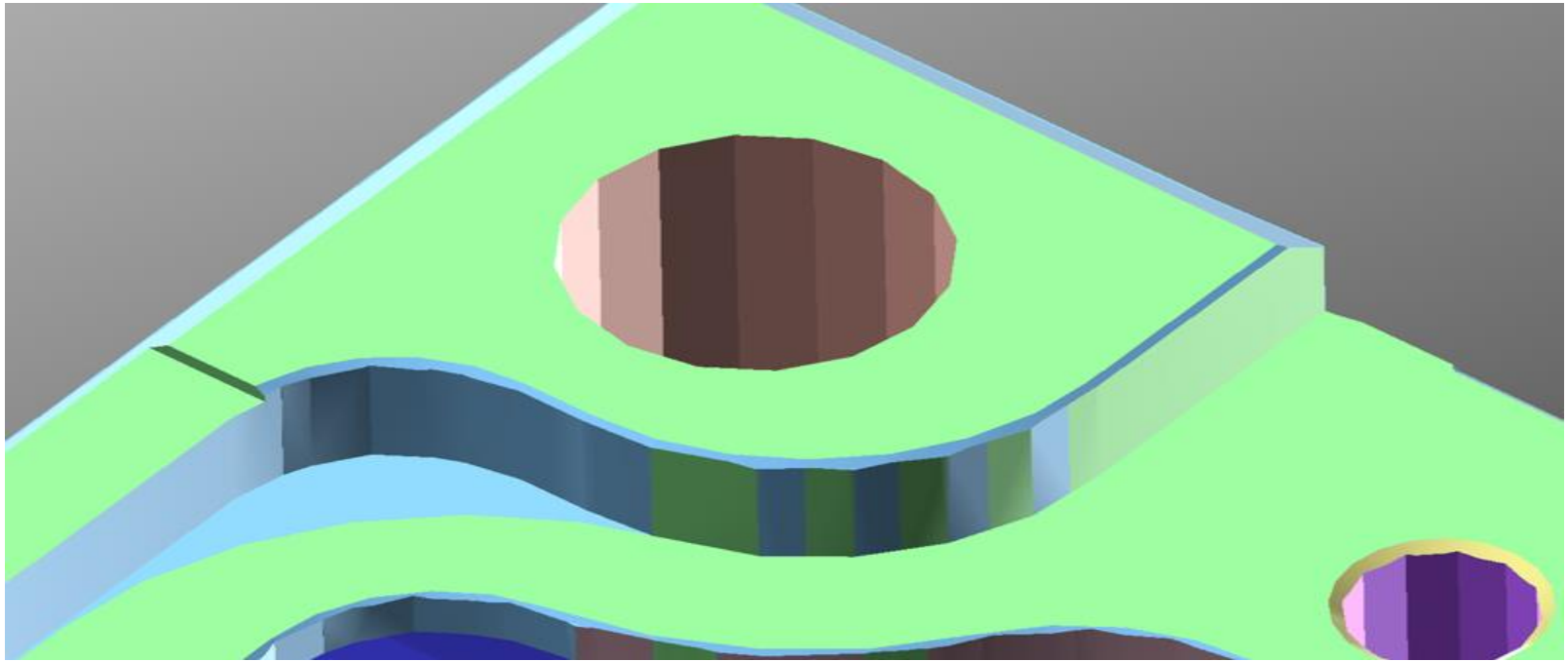
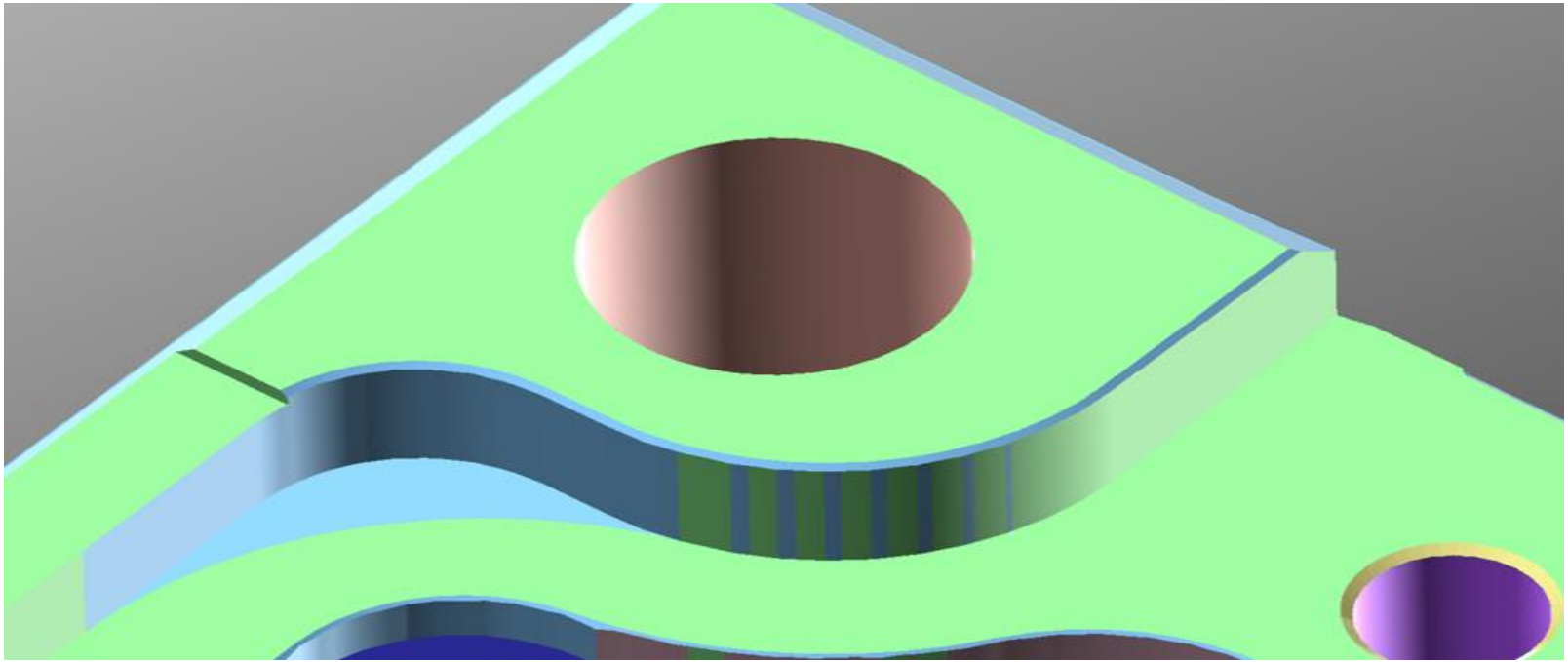
  simulating
- Prone to failure
- Poor 5-axis trajectory sweep



Polygons are inherently inaccurate.



But there are smoothing tricks…



Better Verification Technology

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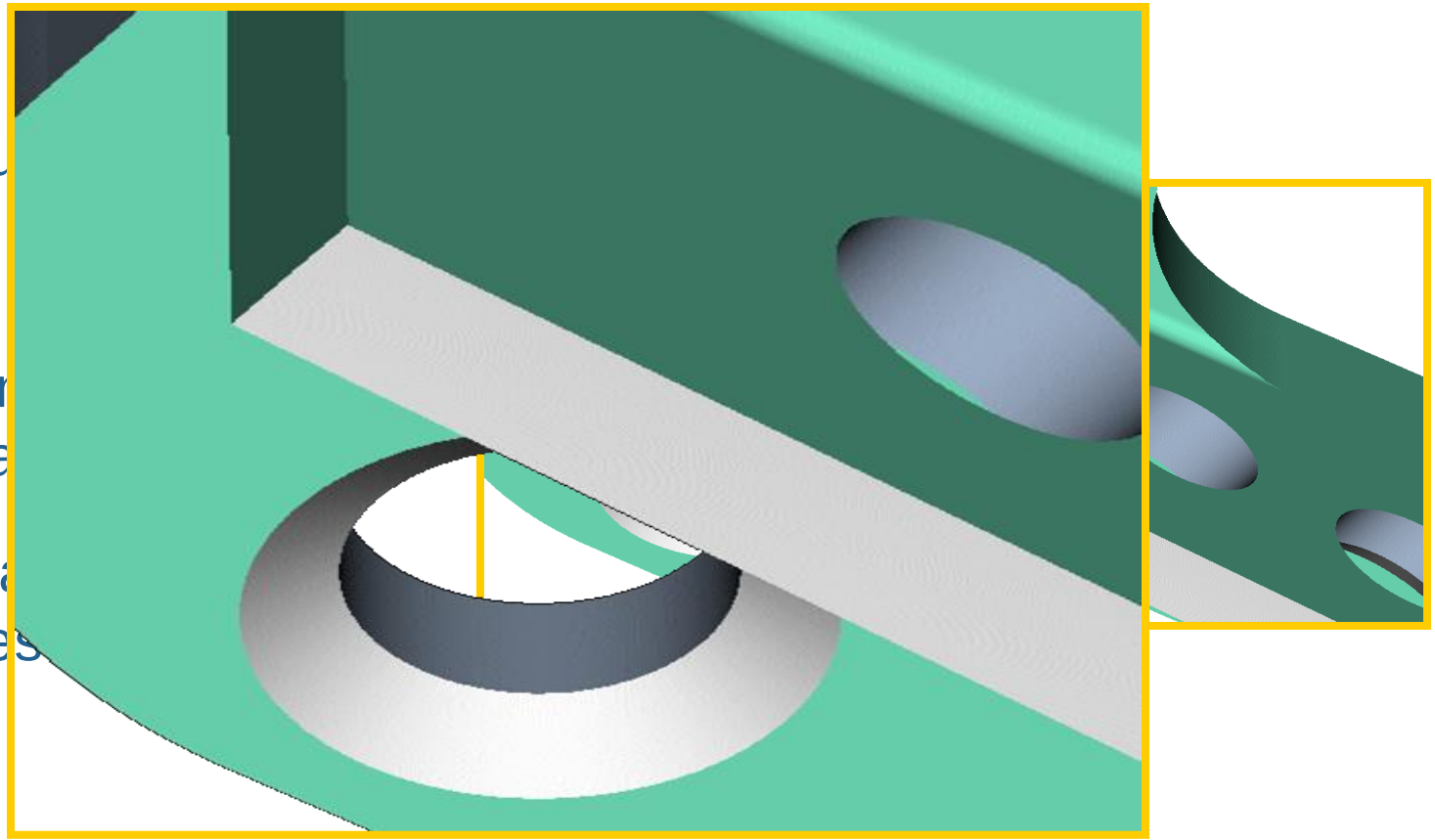
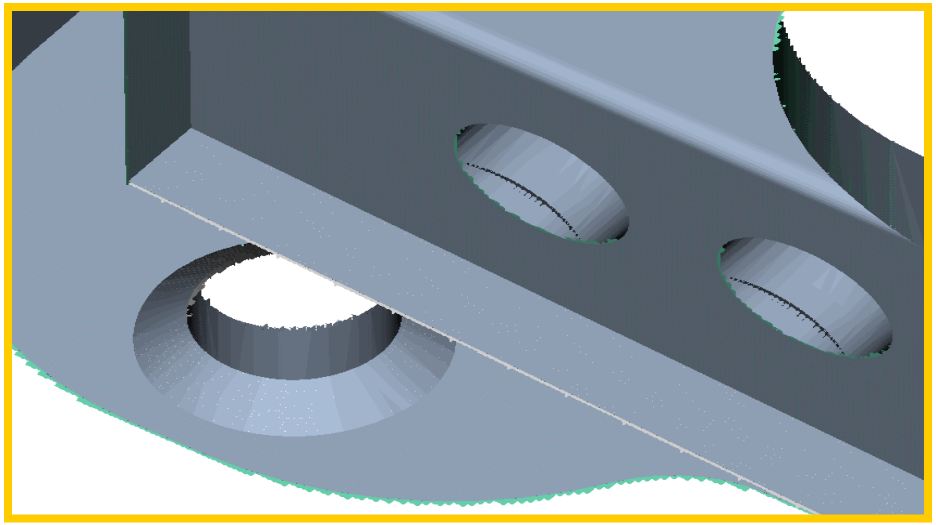
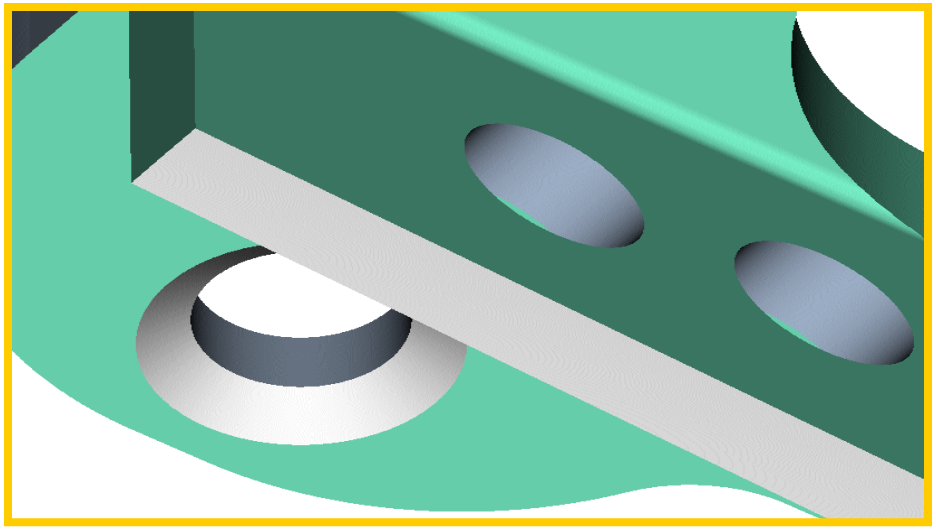


Cut Stocks Compared





Simulated features must match the physical process in order to be used with confidence.

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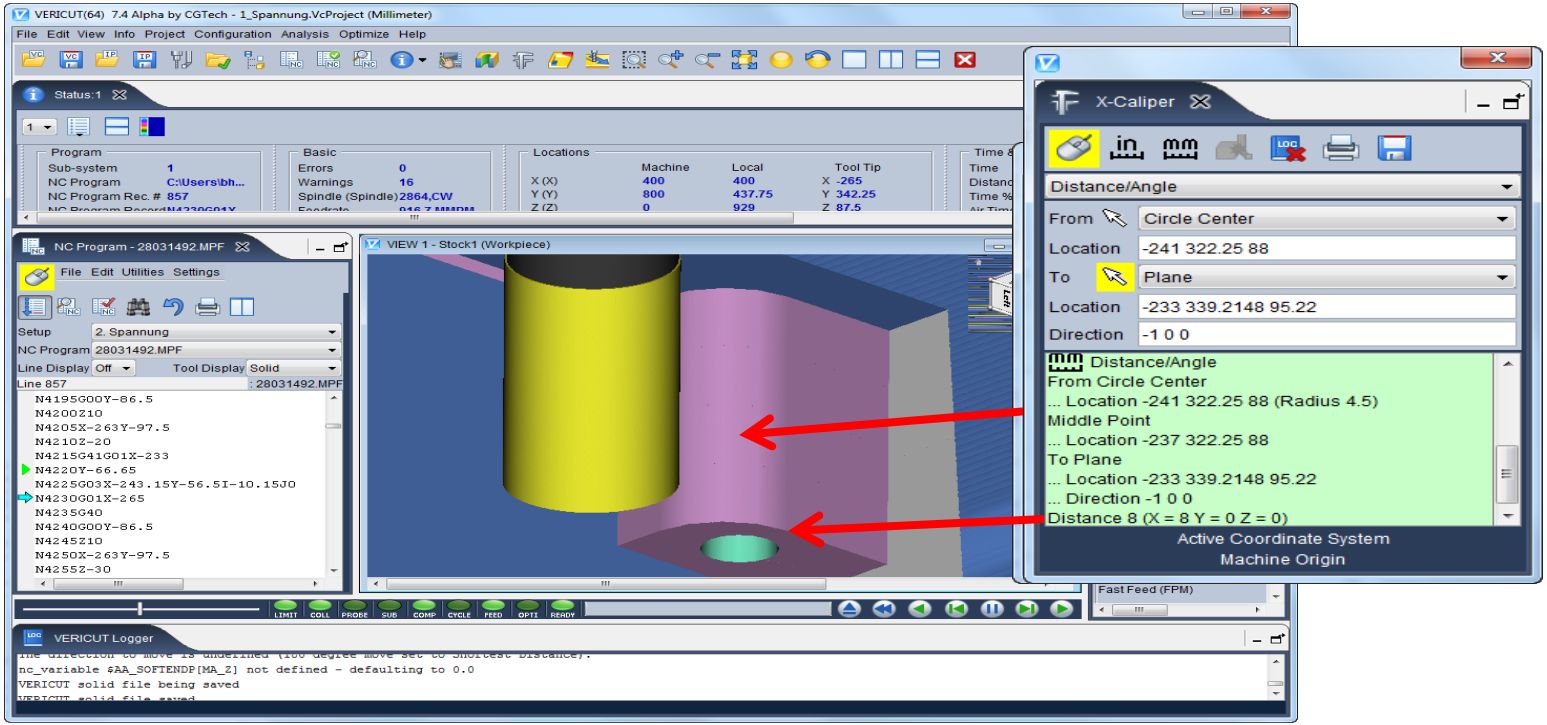
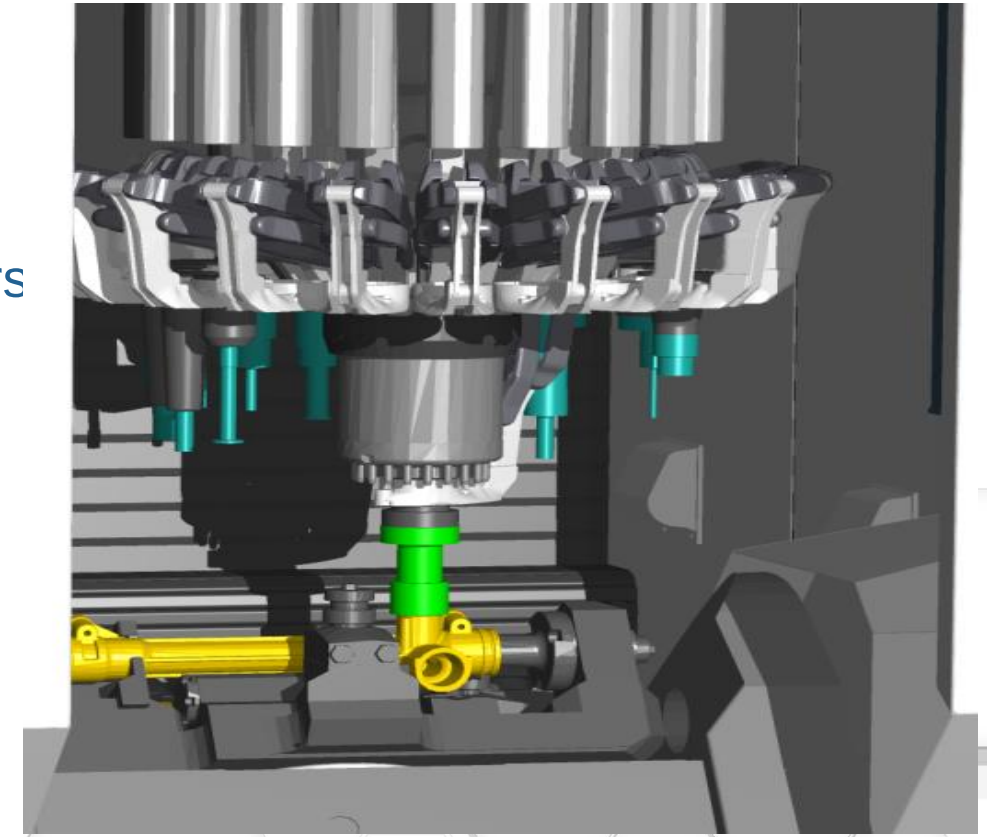
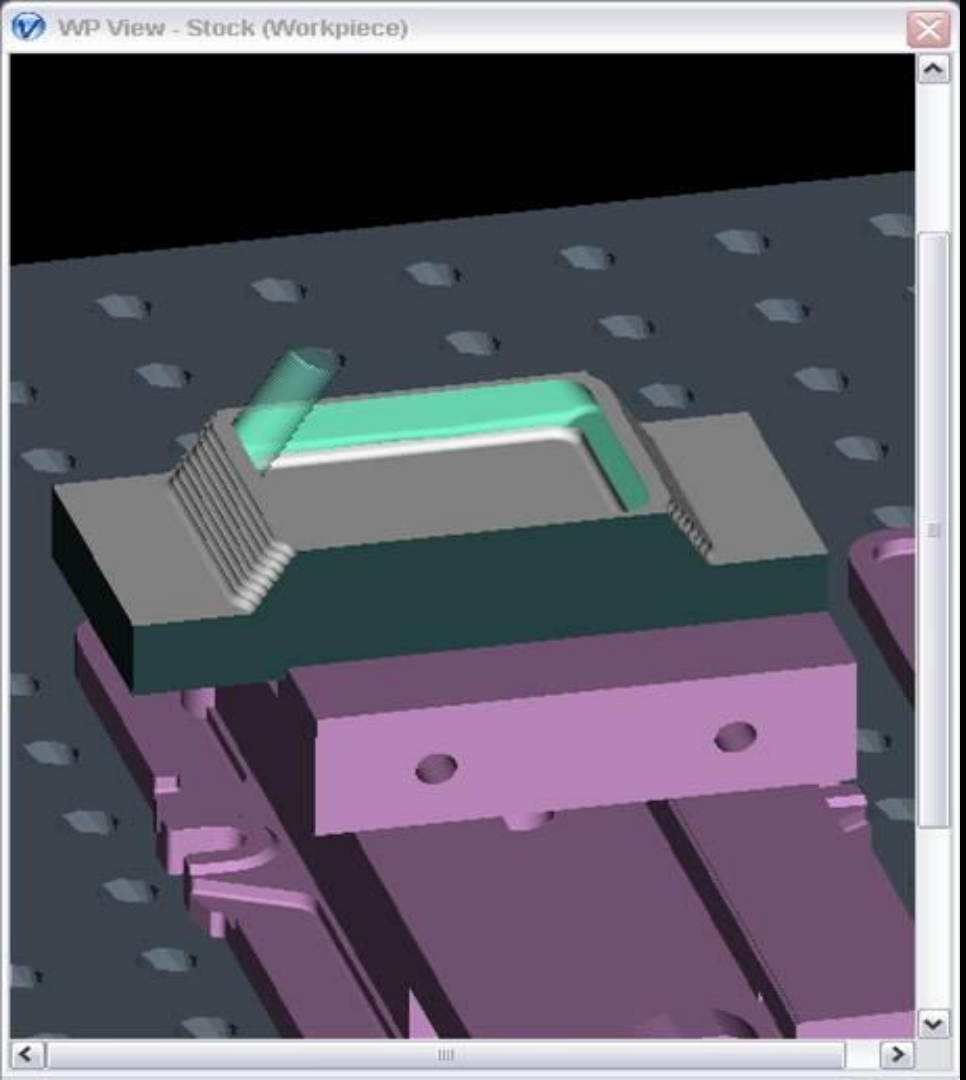


Why simulate the machine?

- Detects collisions and near-misses between machine components
- Eliminate costly machine repairs and delays
- Increase shop safety
- Improve process efficiency
- Reduce the time it takes to implement a new machine





Do I really need to simulate the entire machine?

The simulation process is simple.

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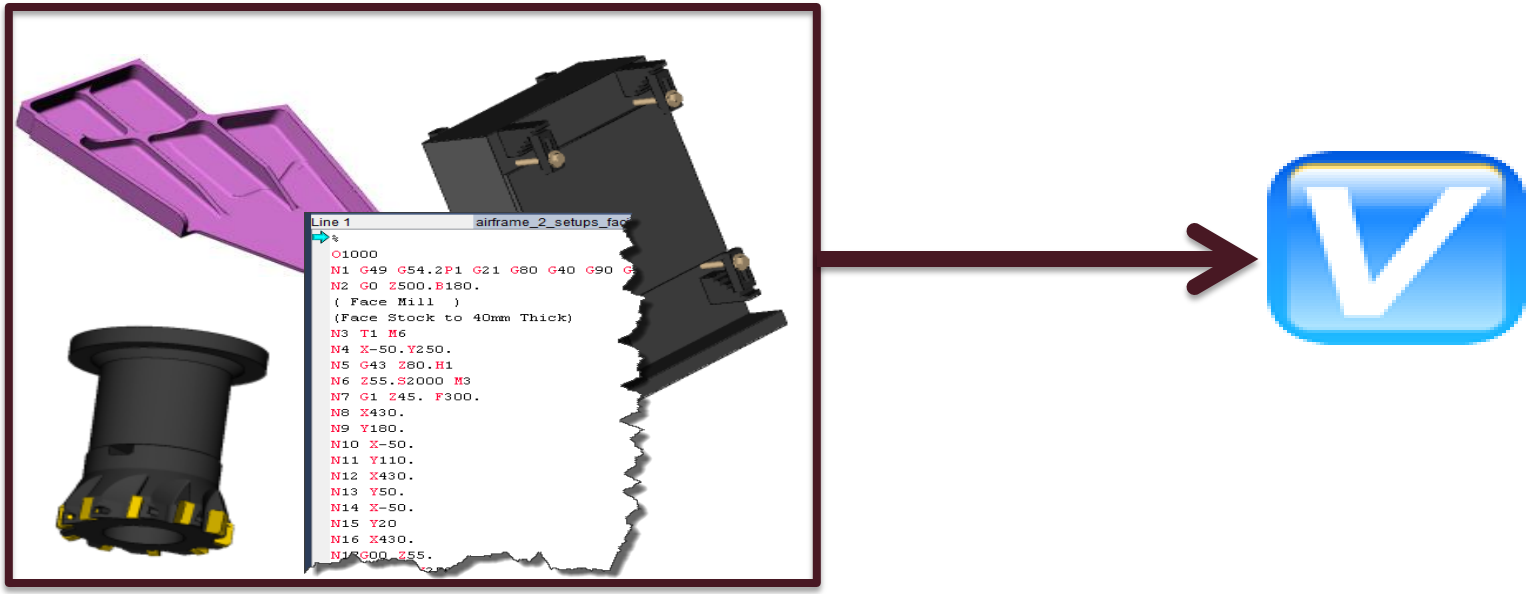
Step 1: CAM Interface sends information to the simulation session.



The simulation process is simple.

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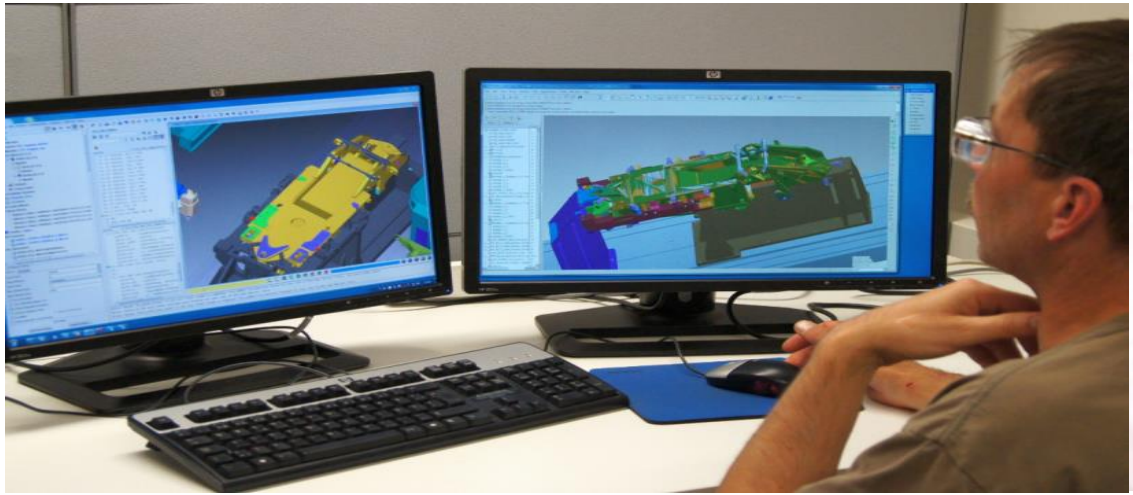
Step 2: Run the simulation. You do not have to watch it run. Work on other things, or use batch mode to run jobs overnight



The simulation process is simple.

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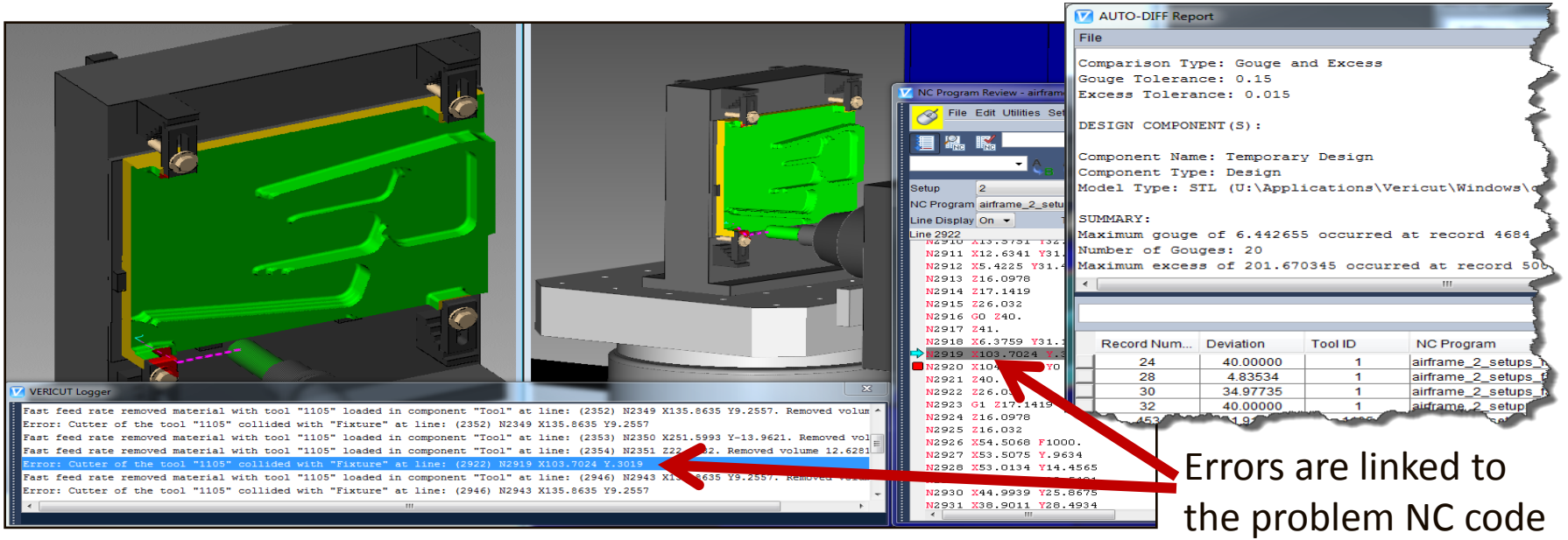
Step 3: Review the output. If there are problems, investigate and fix. If not…



The simulation process is simple.

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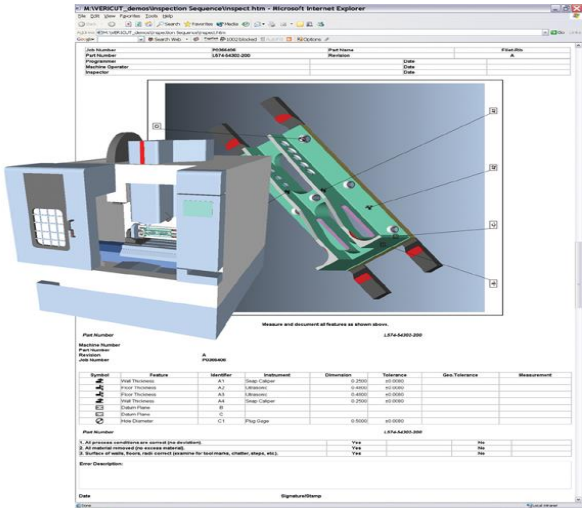
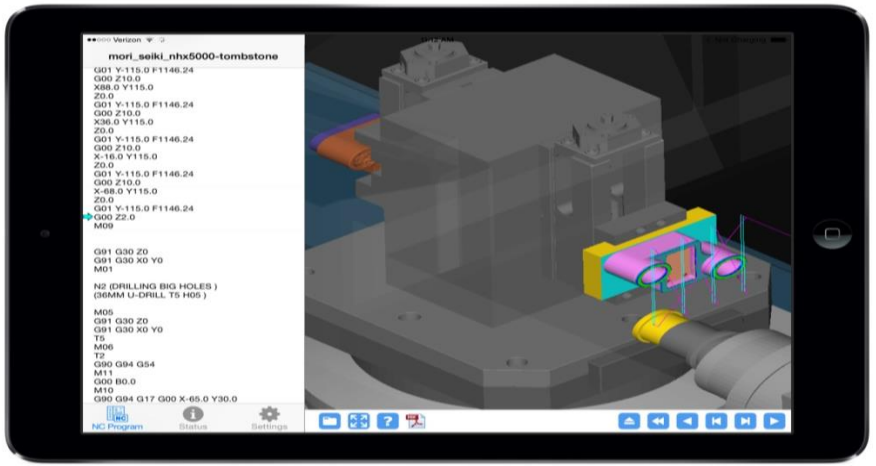
Step 4: Automatically output set-up sheets and inspection documents. Send the job to shop. Done.





Conclusion

- Simulation can significantly shorten the time required to get a new machine in production

- Not all simulation is equal
  - –Confidence requires proven technolc

- Your feedback is valuable
- Don’t miss out on the chance to provide your feedback
- Gain a chance to win an instant prize!
- Complete your session evaluation now

Thank you!

Jim Huddy, National Sales Manager

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