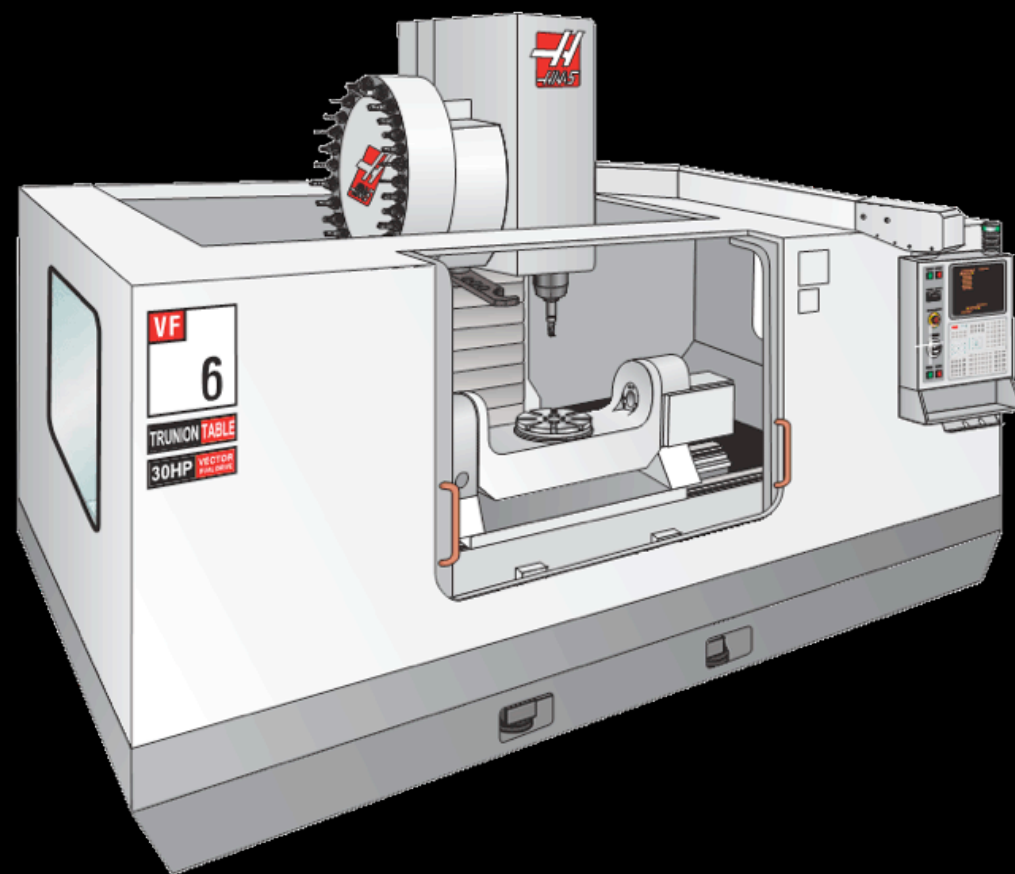
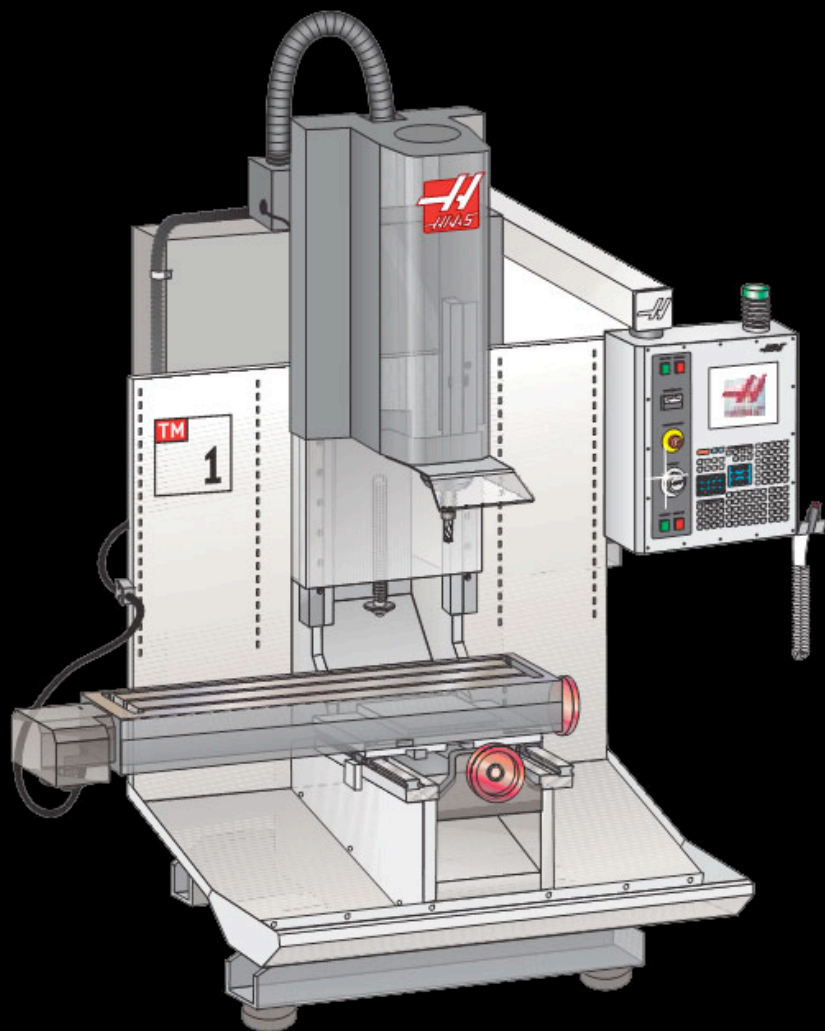


ME 3633 Spring 2007

Computer Numerical Control (CNC)

*D.B. Rauchwerk*



# CNC Continuum

High Precision/High Complexity

Hybrid

High Reproducibility



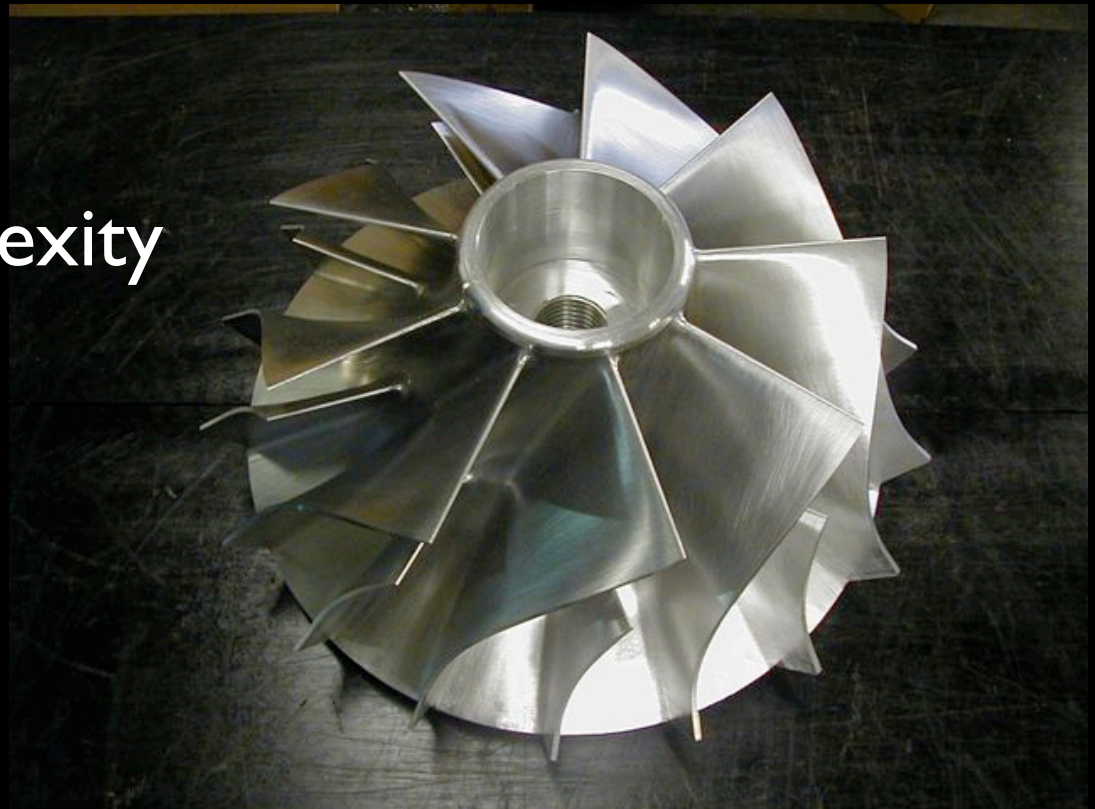
# High Reproducibility

- “I need 10,000 of Widget X”
- Speed - Decrease in Lead Time
- 24/7 Operation
- Low Relative Complexity
- Commonly 3 Axis



# High Precision/High Complexity

- “I need Widget Y with a .0001” Tolerance”
- 4 & 5 axis
- High Relative Complexity



Centrifugal Pump Impeller - 5 axis

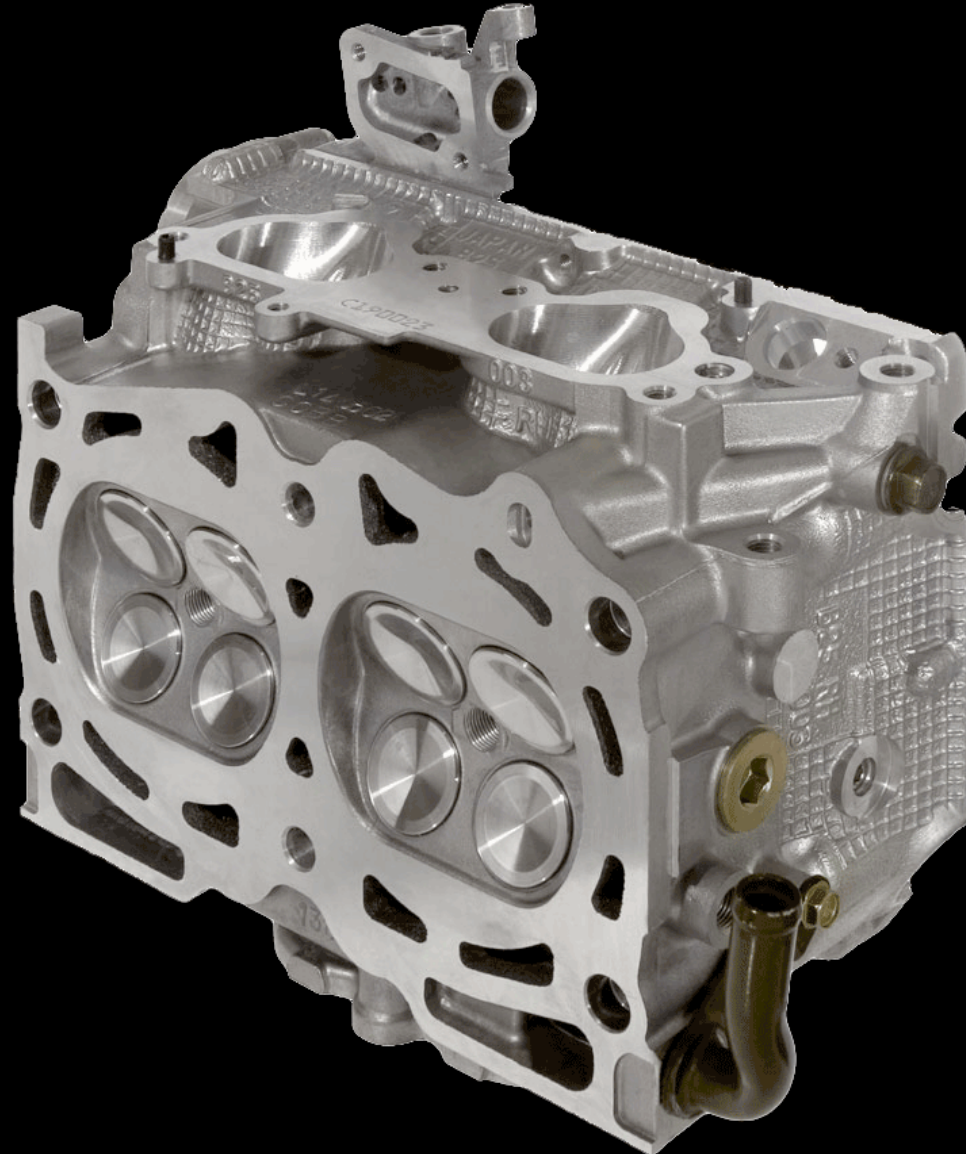
# 5 Axis

- Simultaneous vs. Positioning
- Profiling Head vs. Trunnion/Rotary Table



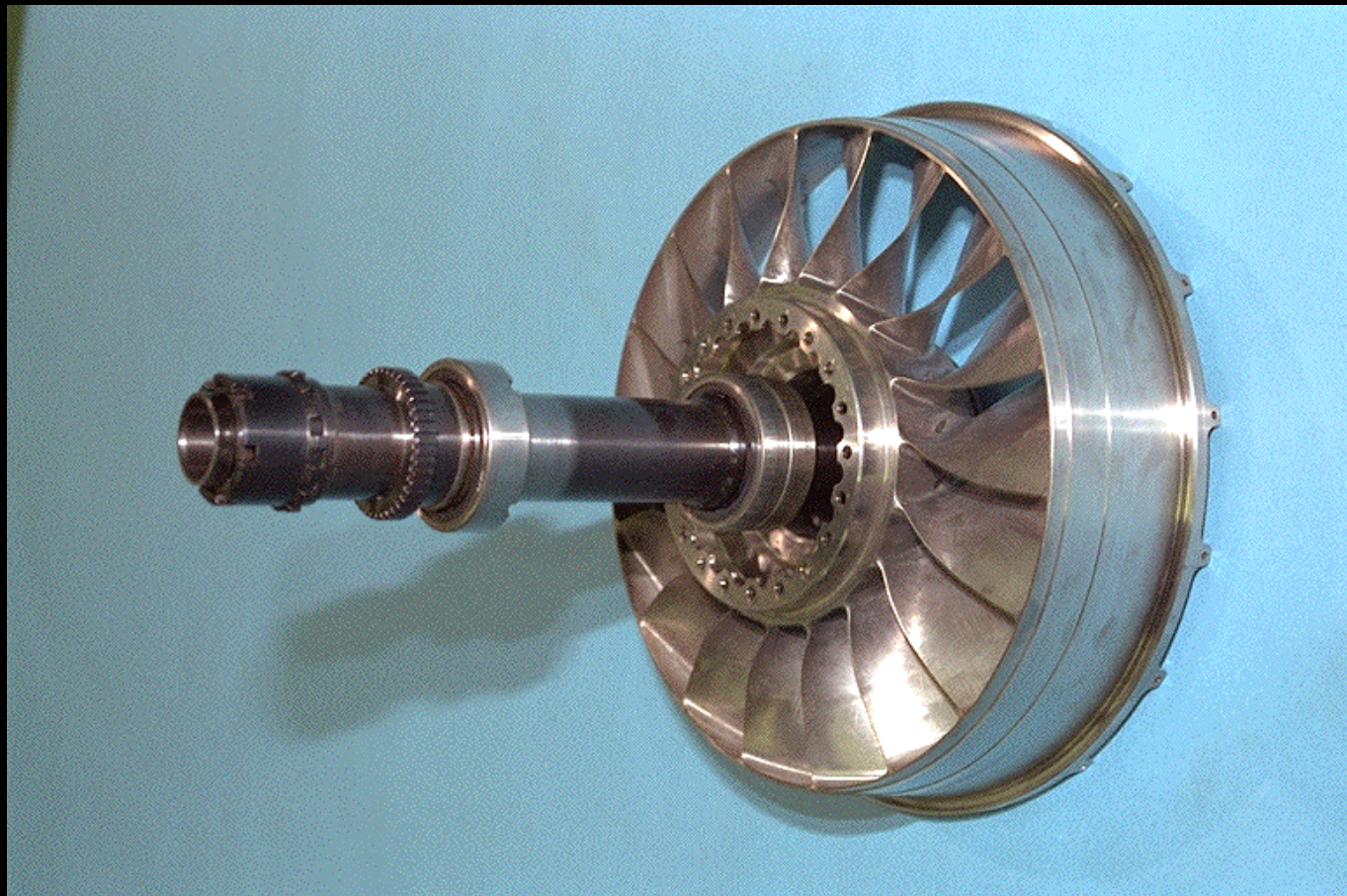


# Cobb Tuning Subaru STi Stage 2 Cylinder Head - 5 axis



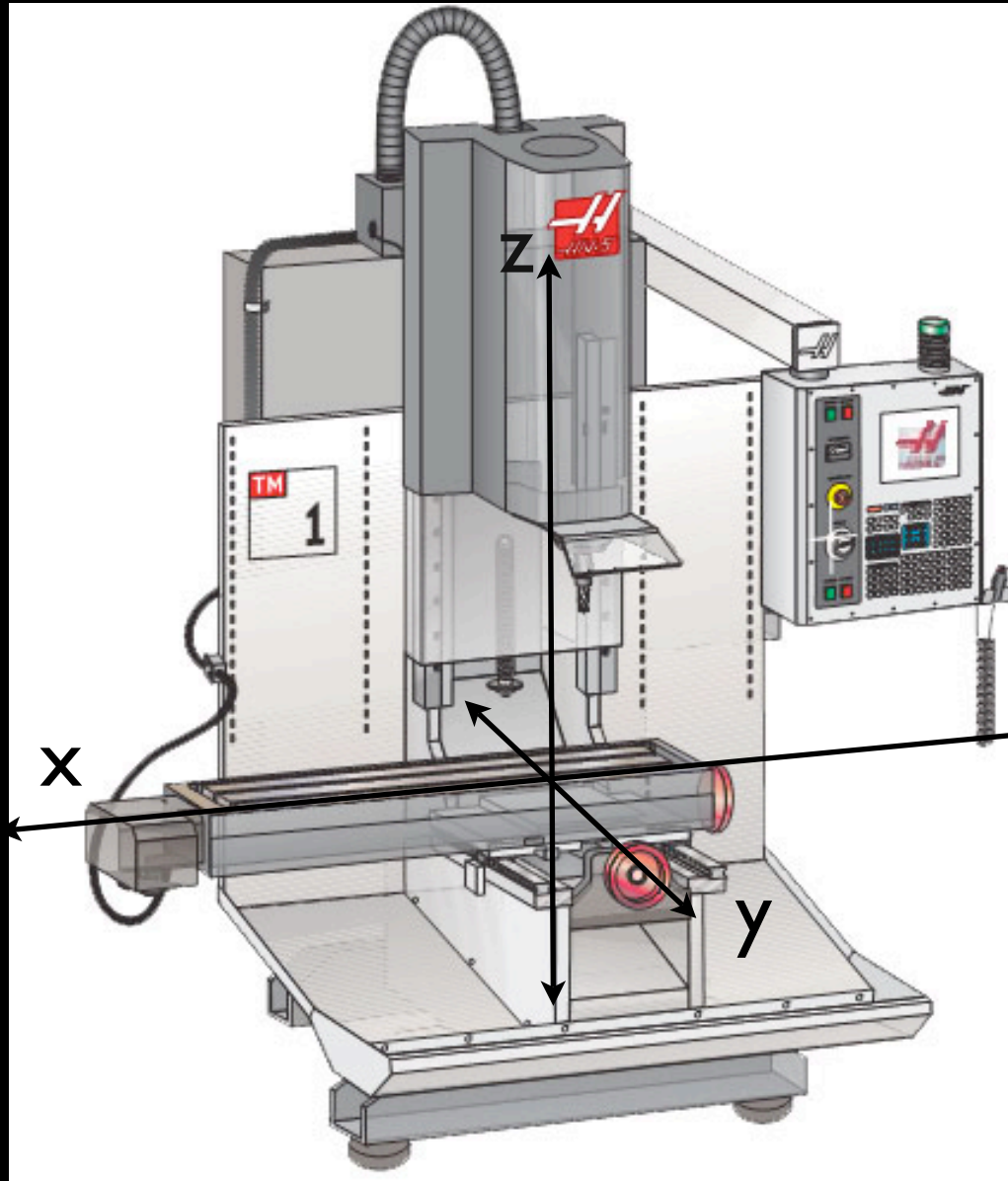
# Hybrid Case

- “I need 10,000 of Widget XY with .0001” Tolerance”

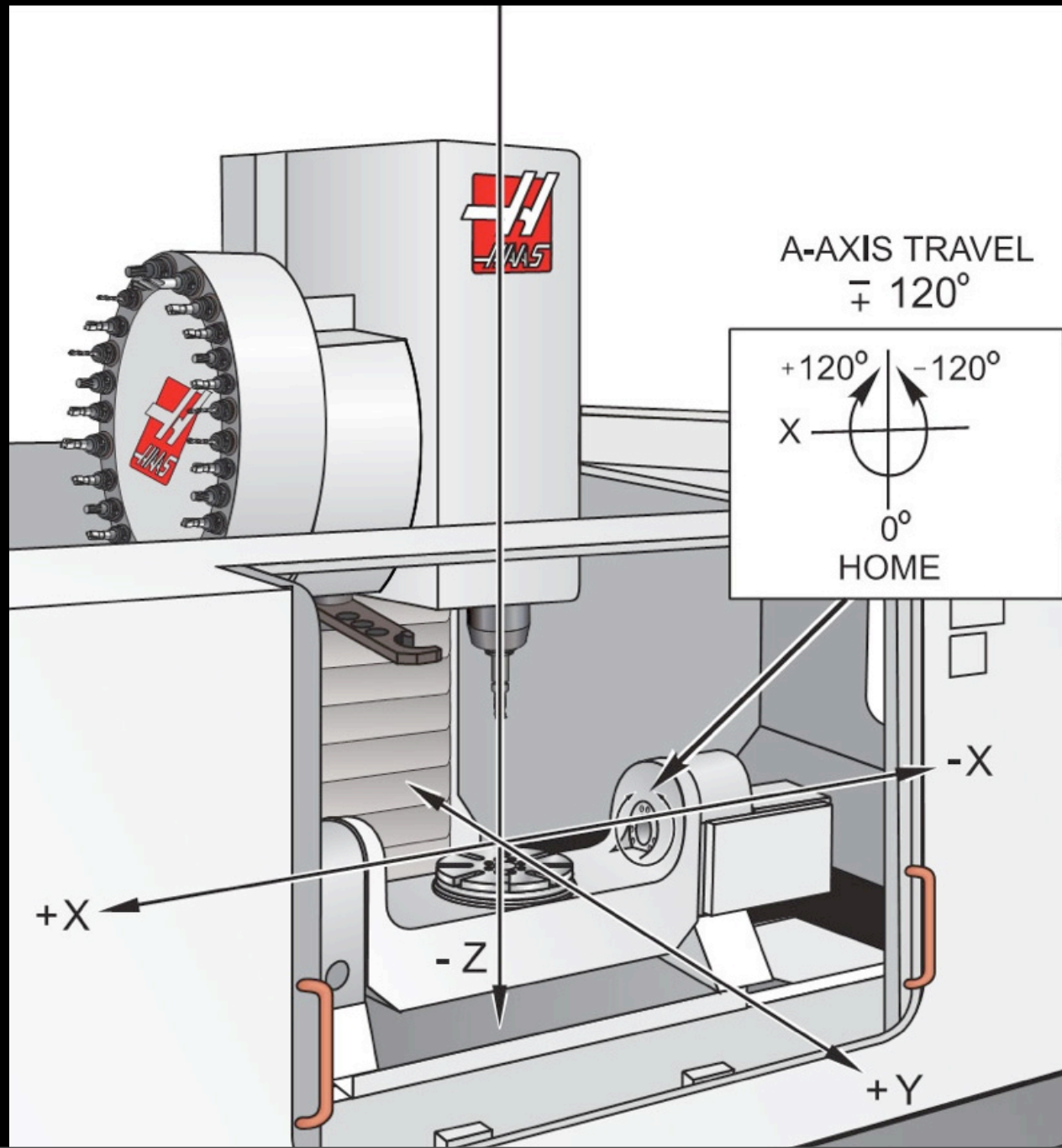




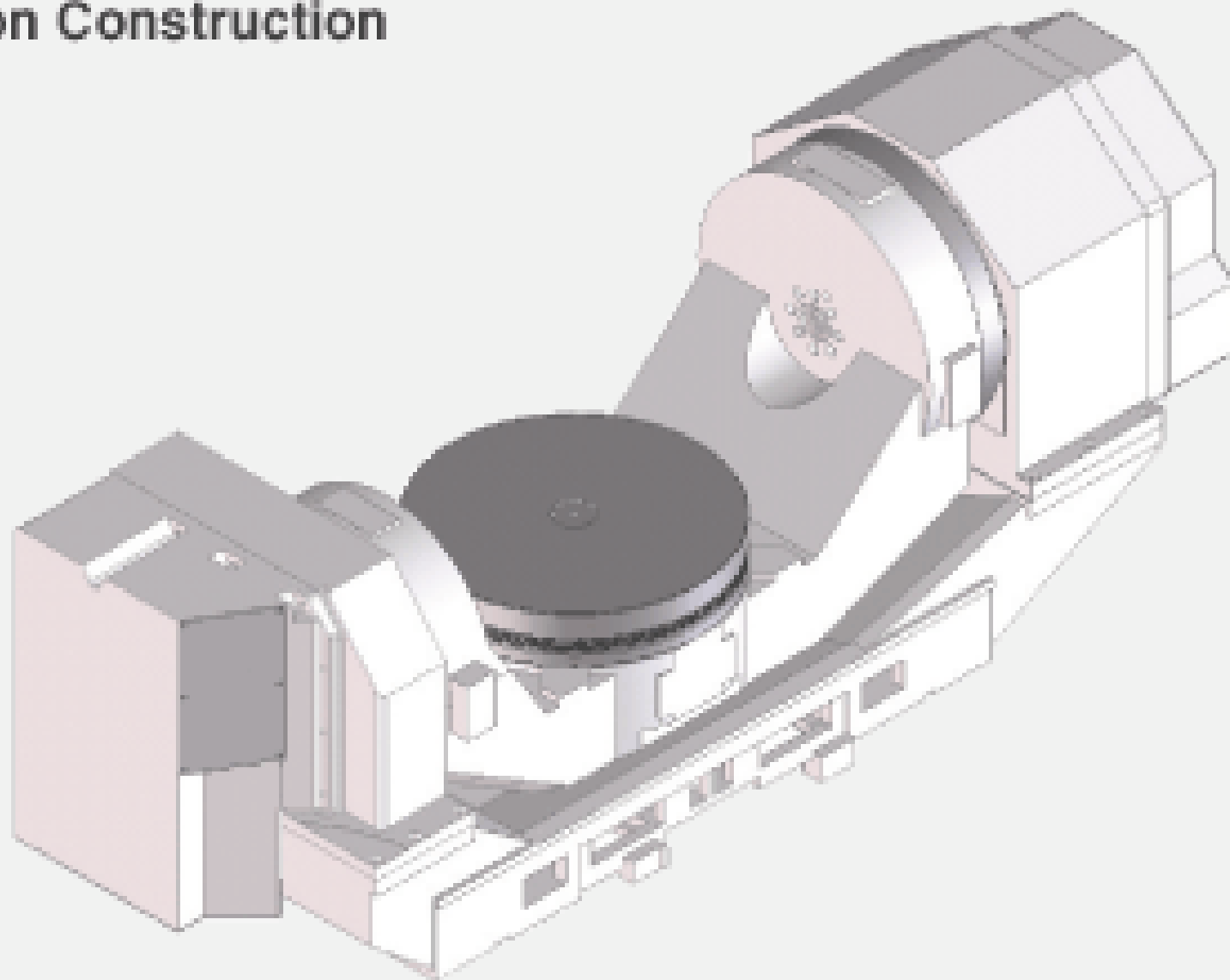
# 3 Axis WCS



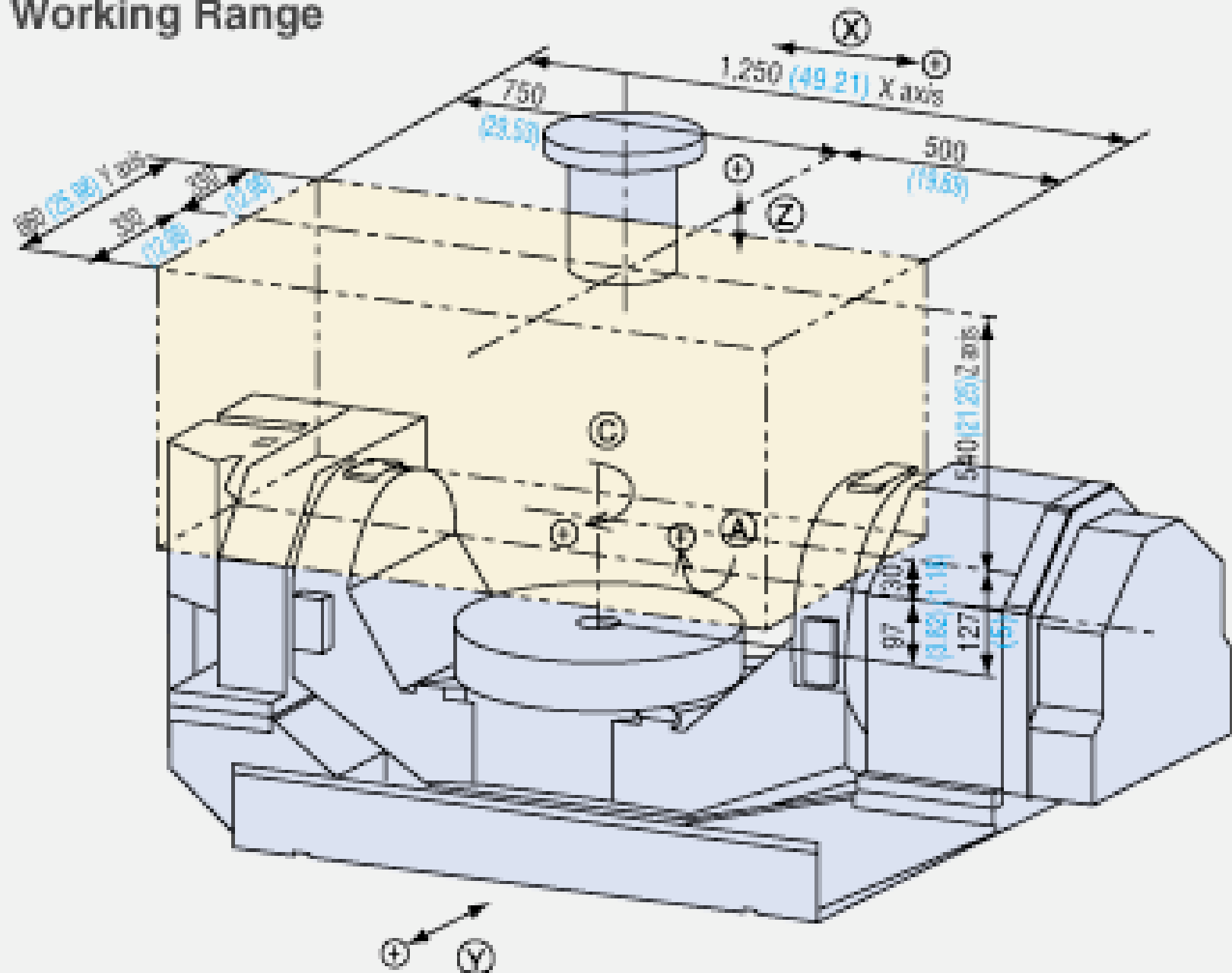
# 5 Axis WCS



## Trunion Construction

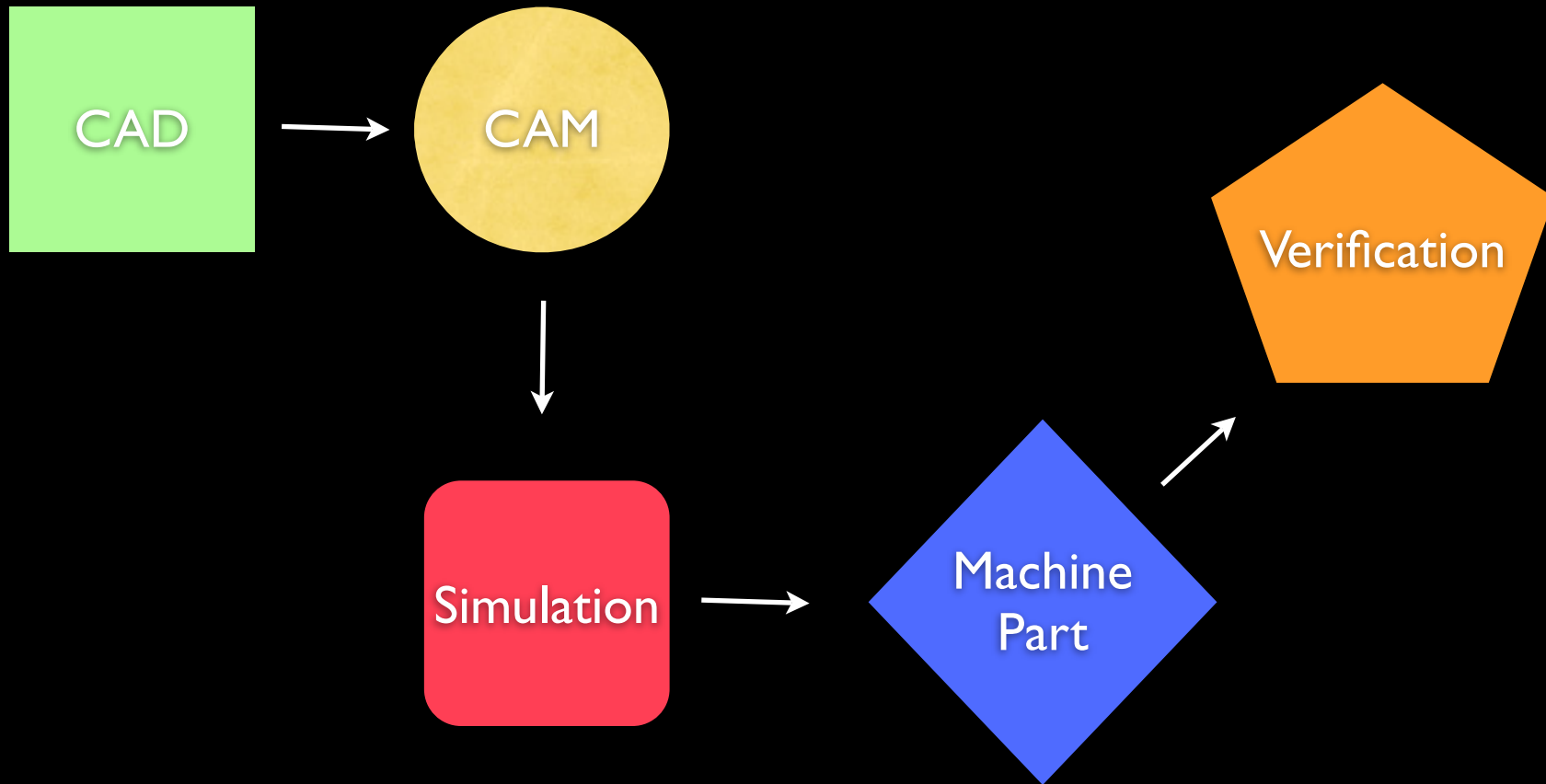


## Working Range

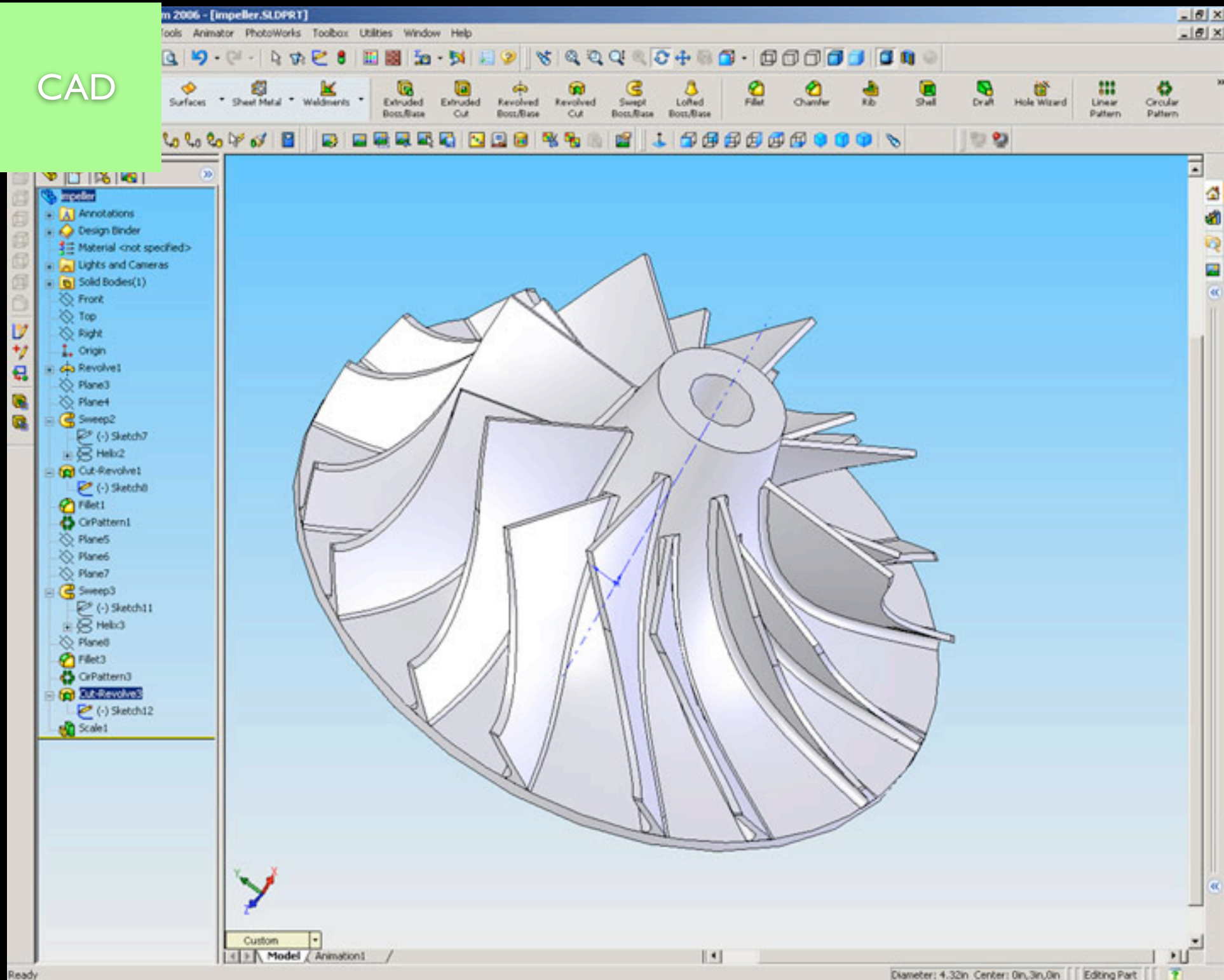




# CNC Workflow

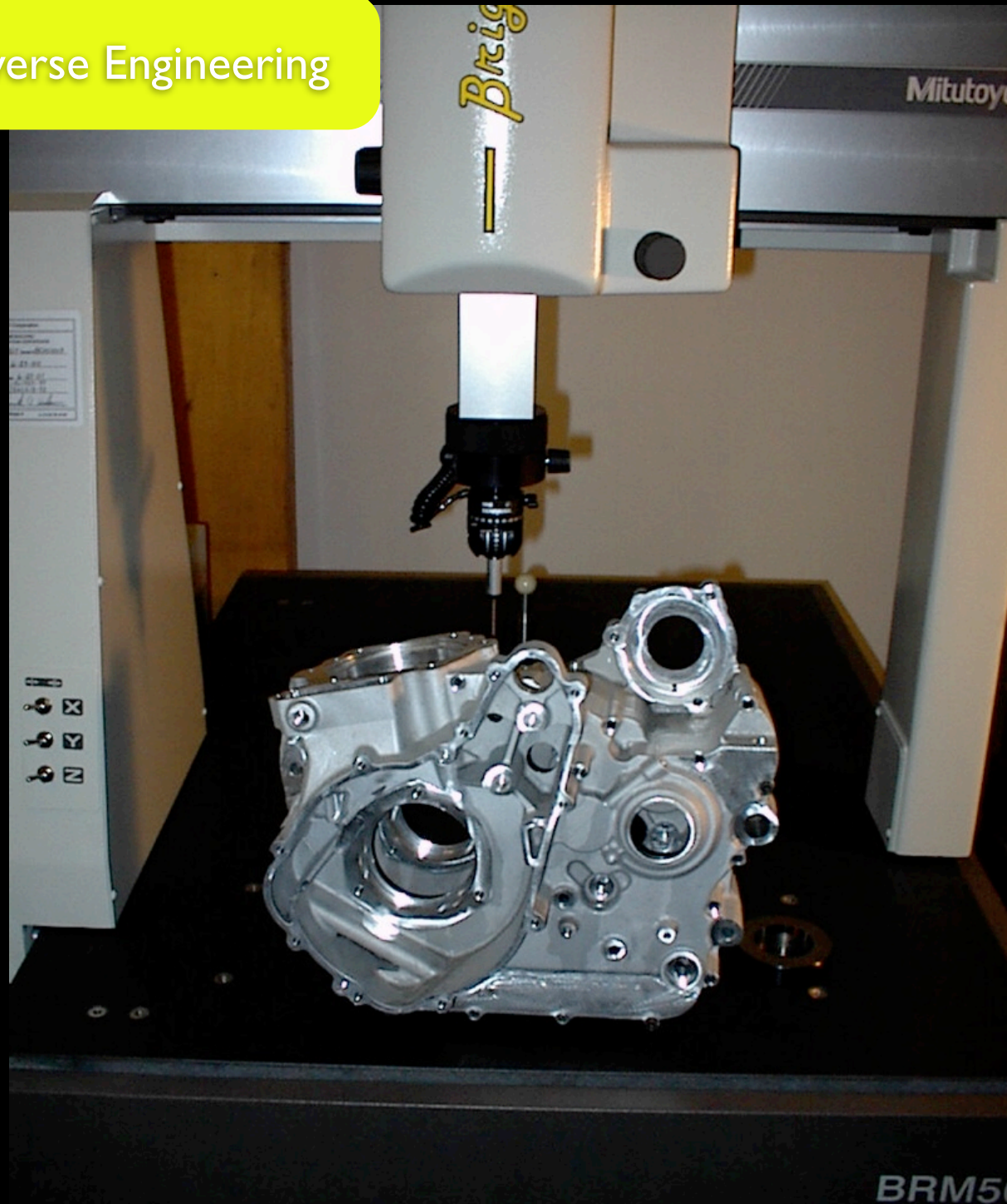


CAD



CAD

Reverse Engineering



CAD

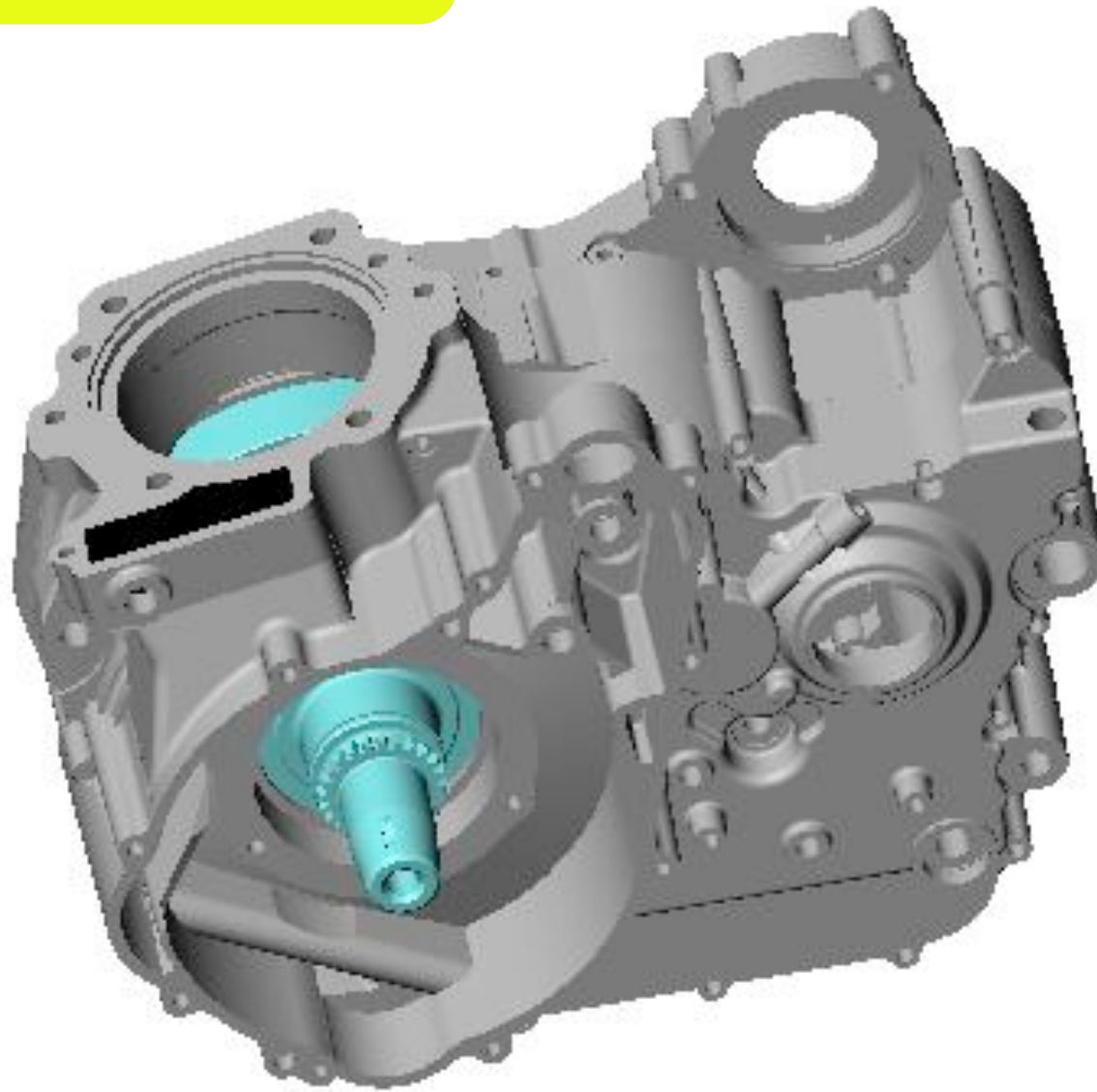
Reverse Engineering





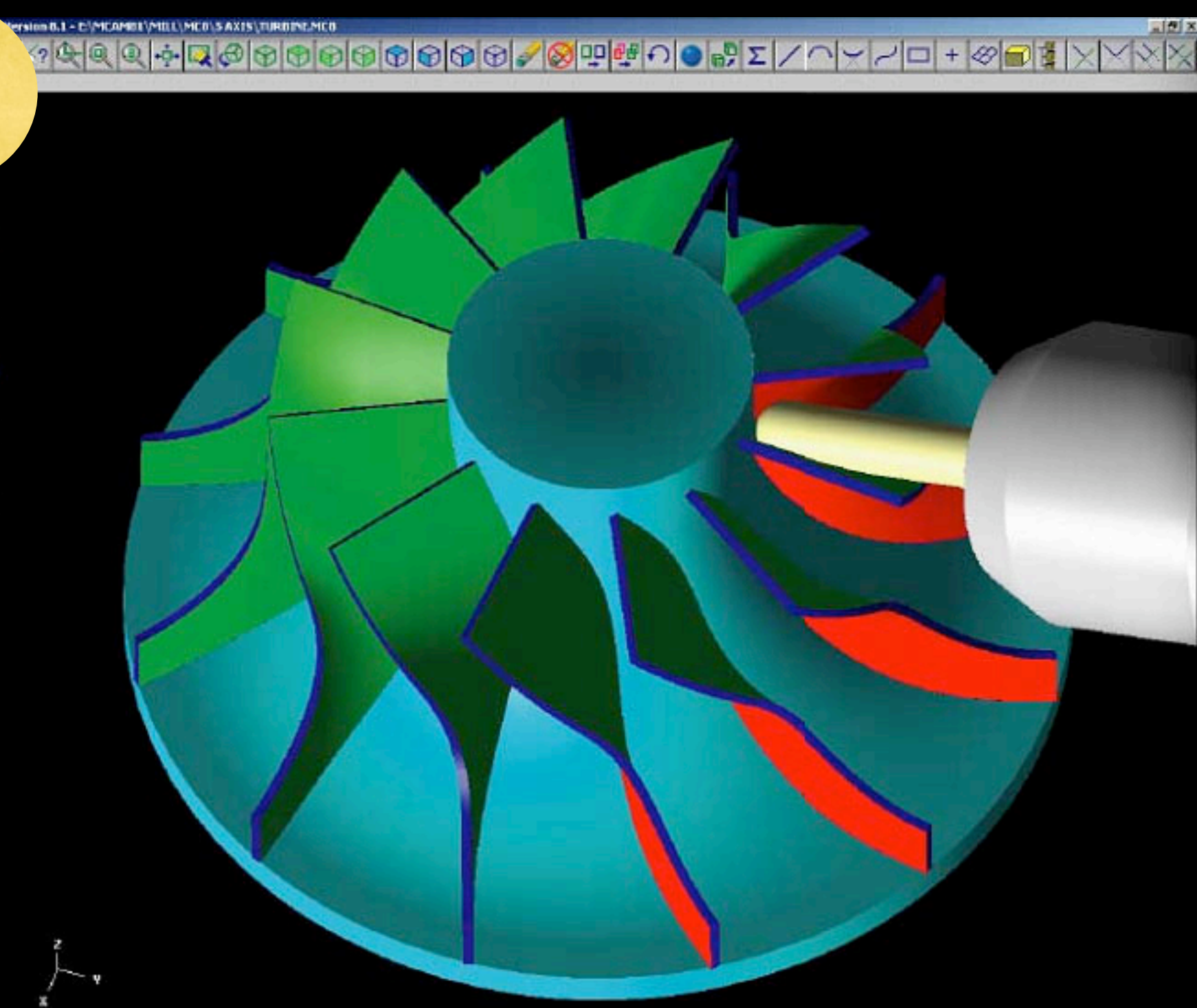
CAD

Reverse Engineering





CAM



MCB file name: Current  
A time estimate is not computed for five axis machining

# Simulation Cimco Edit

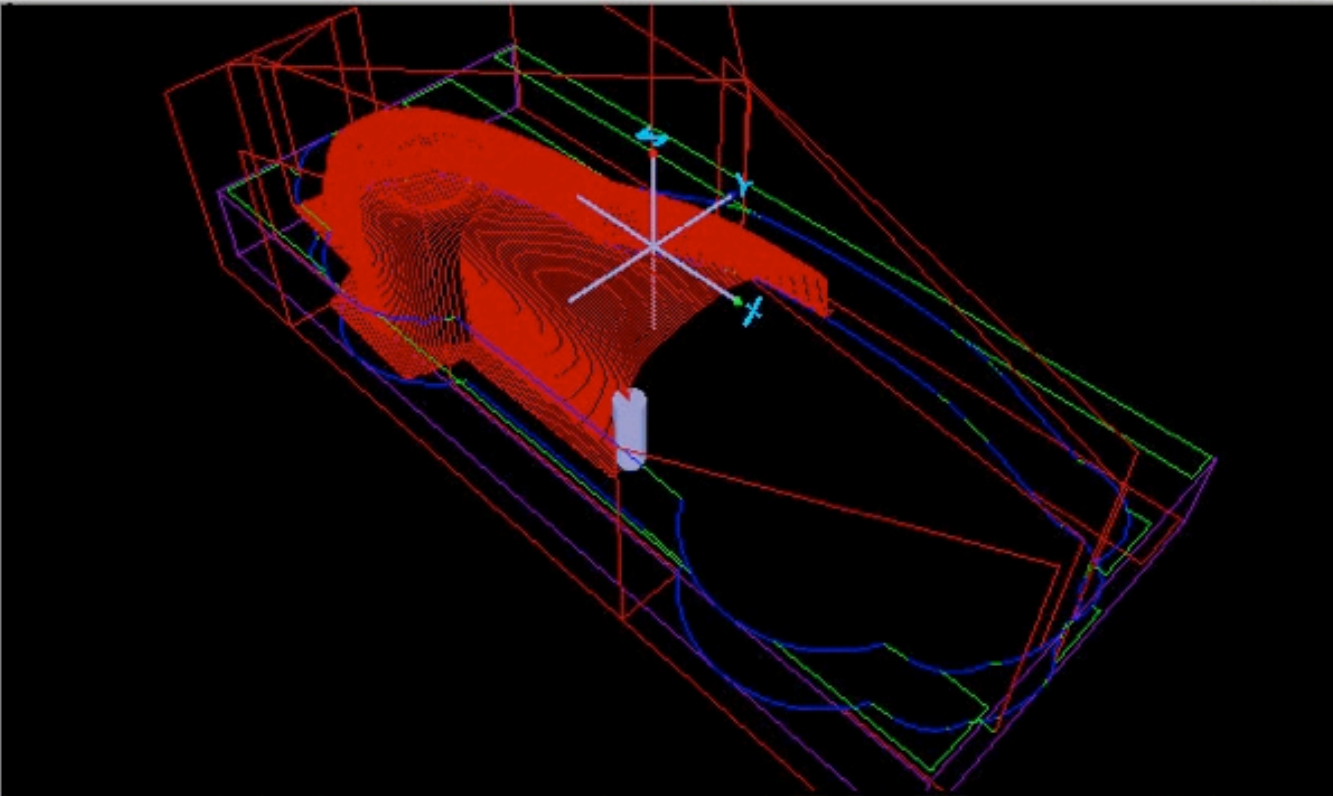
Simulation

NC Functions Transmission CNC-Calc DNC-Max Client Backplot File Compare Setup Window Help

ISO Mill Program start Machine 1

R1001.NC

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N1970 G2X14.Y21.998R9.002
N1980 G1X6.
N1990 G3X3.002Y19.R2.998
N2000 G1Y6.
N2010 G3X6.Y3.002R2.998
N2020 G1X34.
N2030 G3X36.998Y6.R2.998
N2040 G1Y14.
N2050 G2X46.Y23.002R9.002
N2060 G1X54.
N2070 G2X63.002Y14.R9.002
N2080 G1Y6.
N2090 G3X66.Y3.002R2.998
N2100 G1X94.
N2110 G3X96.998Y6.R2.998
N2120 G1Y19.
N2130 G3X94.Y21.998R2.998
N2140 G1X86.
N2150 G2X76.998Y31.R9.002
N2160 G1Y39.
N2170 G2X86.Y48.002R9.002
N2180 G1X94.
N2190 G3X96.998Y51.R2.998
N2200 G1Y64.
N2210 G3X94.Y66.998R2.998
```



X: 96.9980 I: F: 1.5000  
Y: 52.5719 J: S: 3250  
Z: -10.0000 K: T:

Not logged in Licensed to Atlas Mfg. Ln 89/107, Col 9, 2445 bytes INS 10:35:15 PM



Machine  
Part





Verification



# Questions?

