

Metrology solutions

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Global Manufacturing industry issues

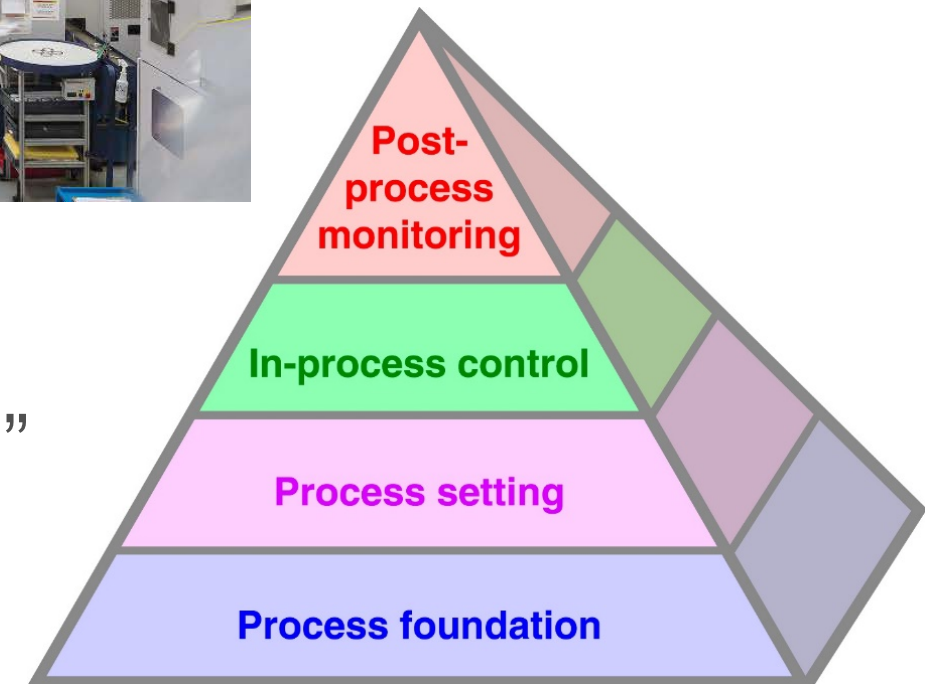
- Increasing complexity & closer tolerances in product designs
 - Driving CNC machined part measurement requirements
- Shortage of skilled engineers to support high tech manufacturing
- Increased use of automation to minimise labour costs – even in Asia
- Shorter product life-cycles compressing process development window



Renishaw manufacturing and the process pyramid



- We've been through these issues ourselves
- The Renishaw "Productive Process pyramid" approach to controlling variation in manufacturing

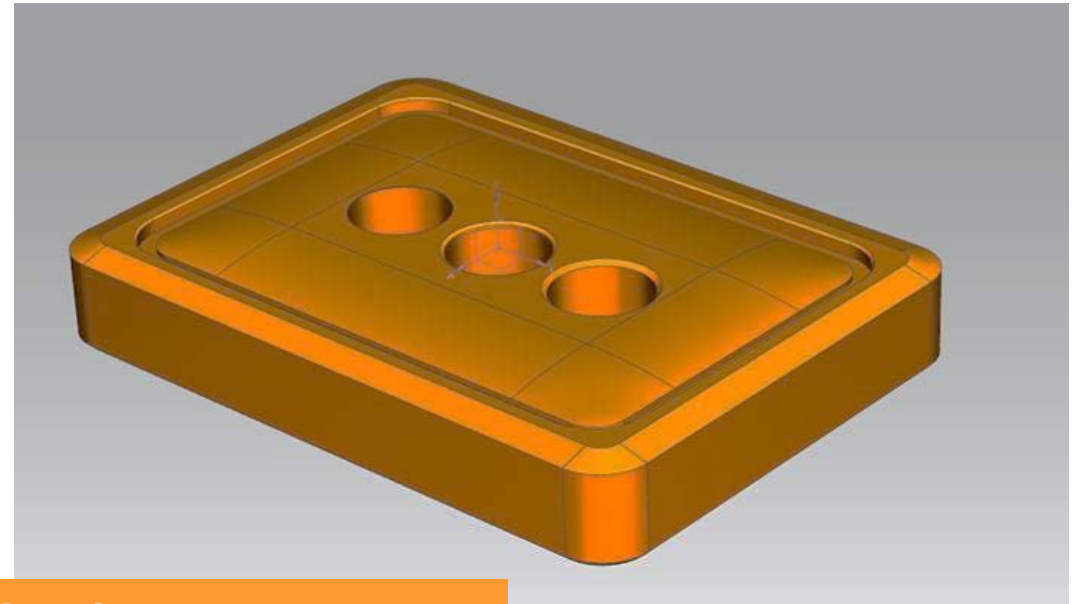


Metrology solutions demonstration

- Demonstration part with representative machined features from multiple industries
- Machined in two discrete machining operations

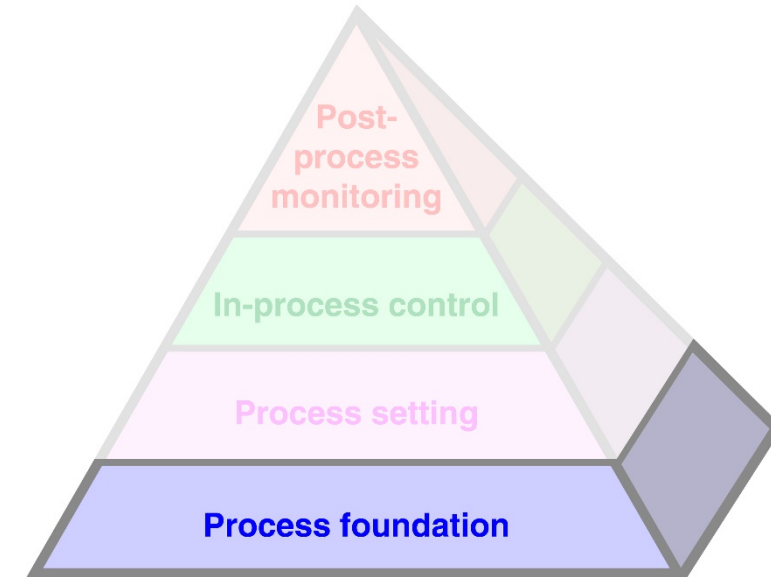
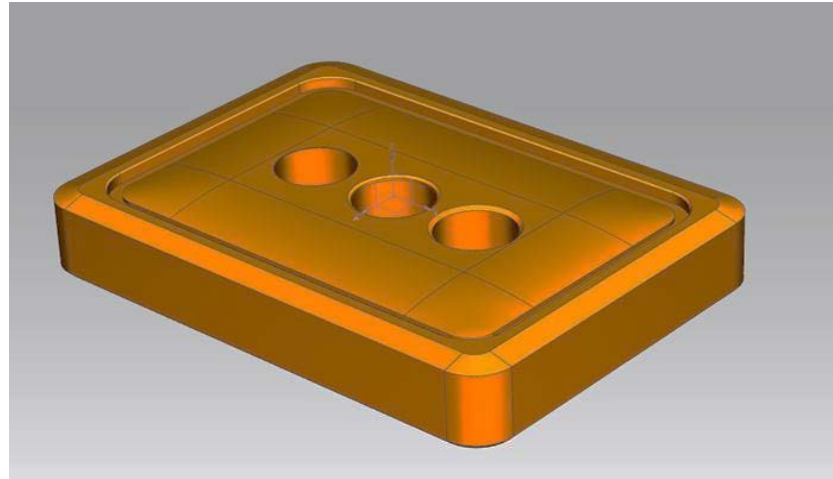


CNC operation 1



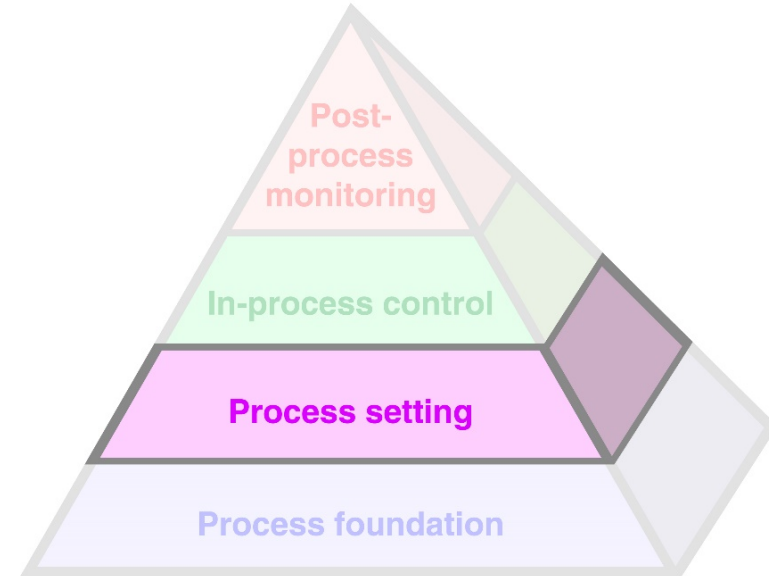
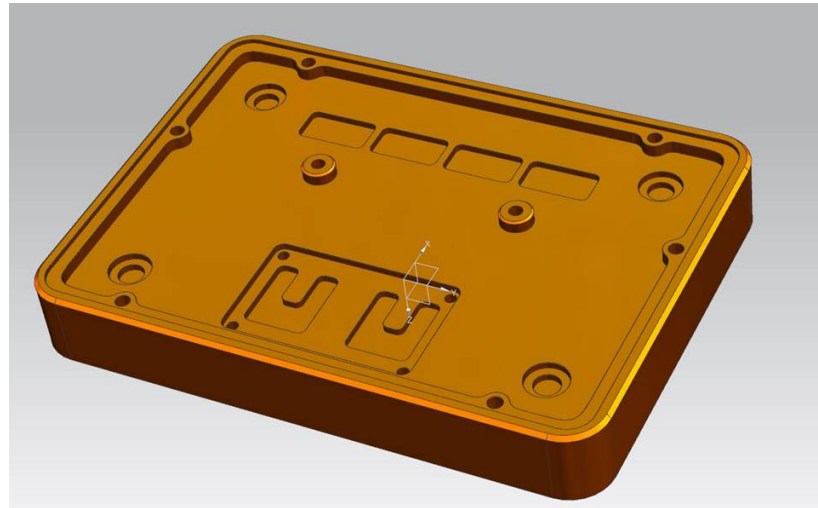
CNC operation 2

Process foundation



Laser and Ballbar systems to calibrate and maintain machine positioning and servo performance
Spindle probes to assure multi-axis accuracy

Process Setting – Tool and part setup

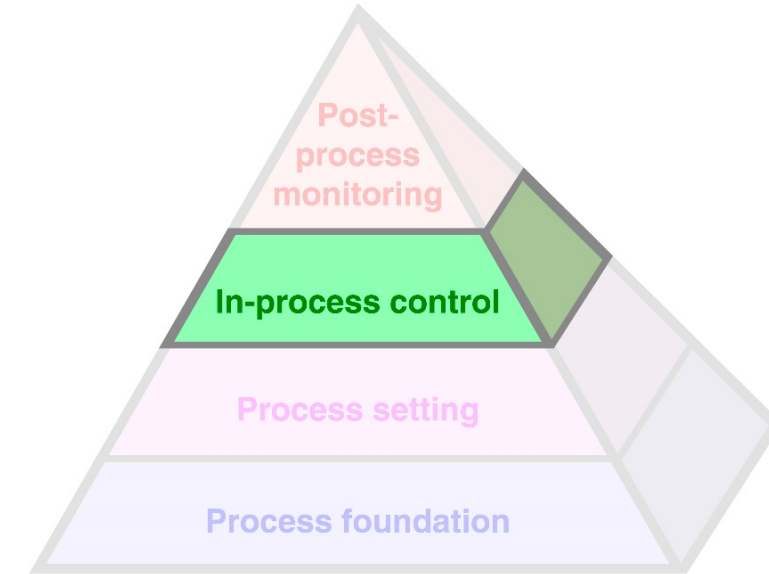
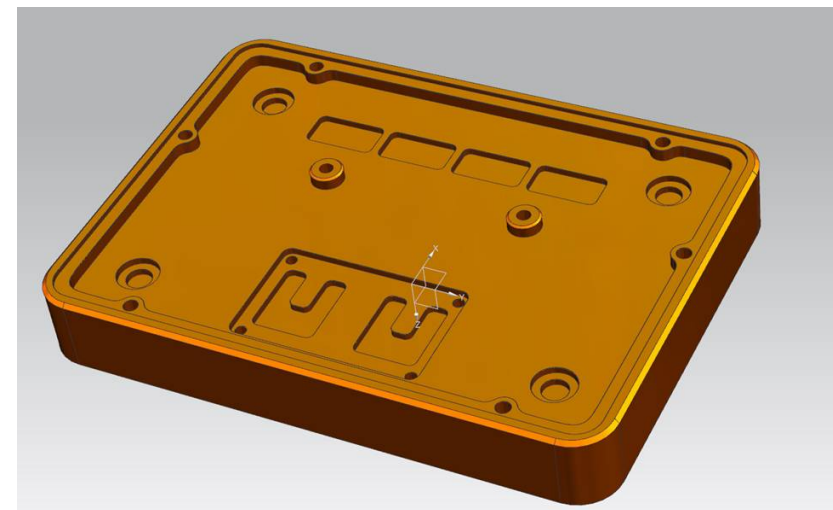
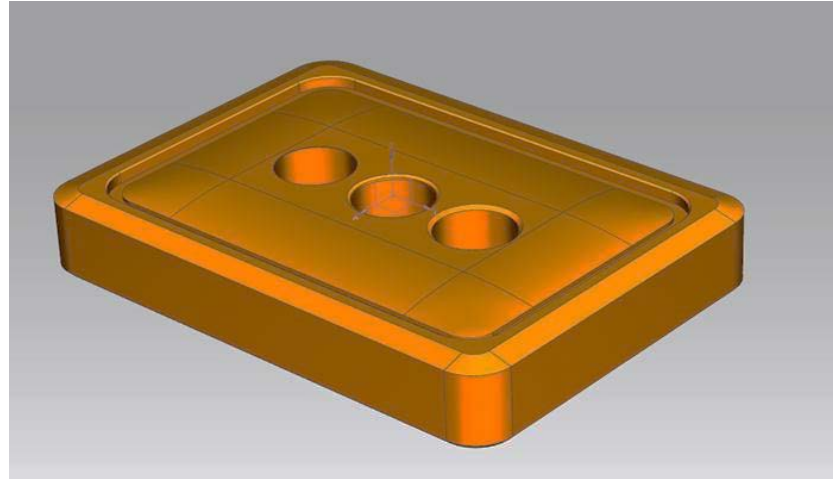


Non contact tool setting

Part location and alignment measurement

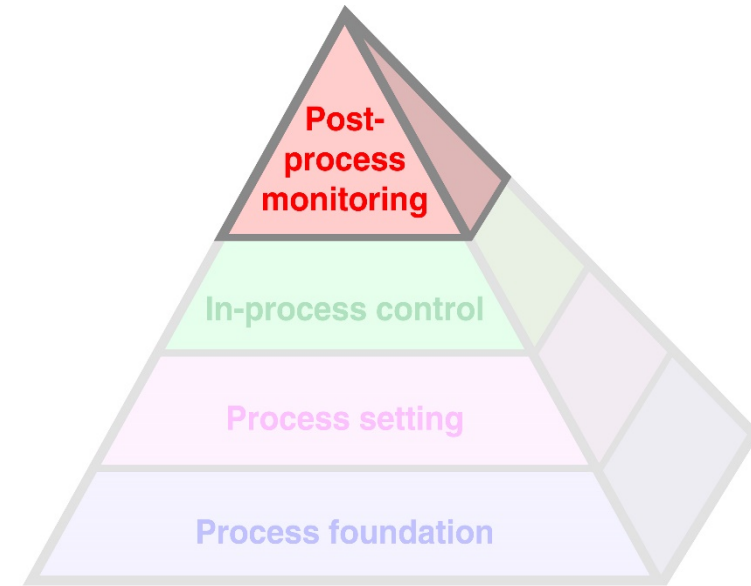
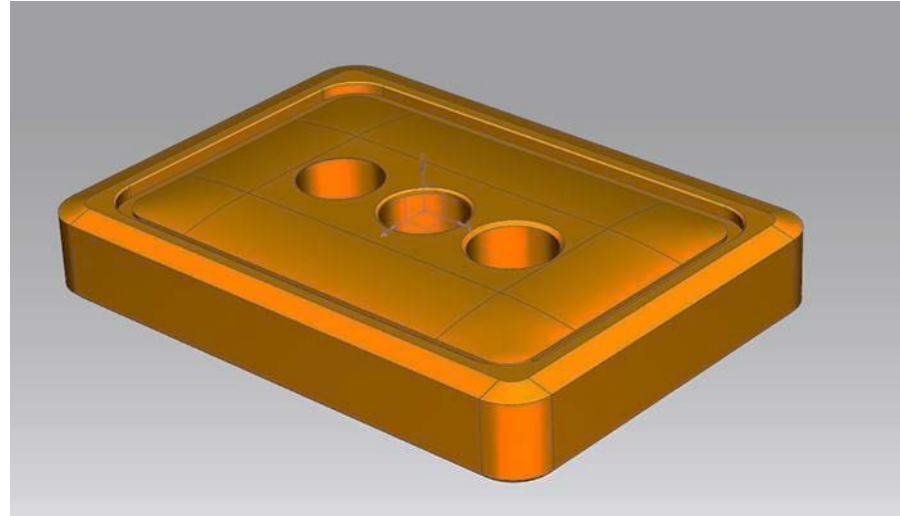
Machined feature measurement

In process control



Process control of machined features using Spindle probing and Equator systems

Post process monitoring



Verification and certification of part conformance to design intent

At point of manufacture or prior to shipment / assembly

Metrology solutions demonstration

- Sales and Applications teams have a range of proven solutions for manufacturing challenges

