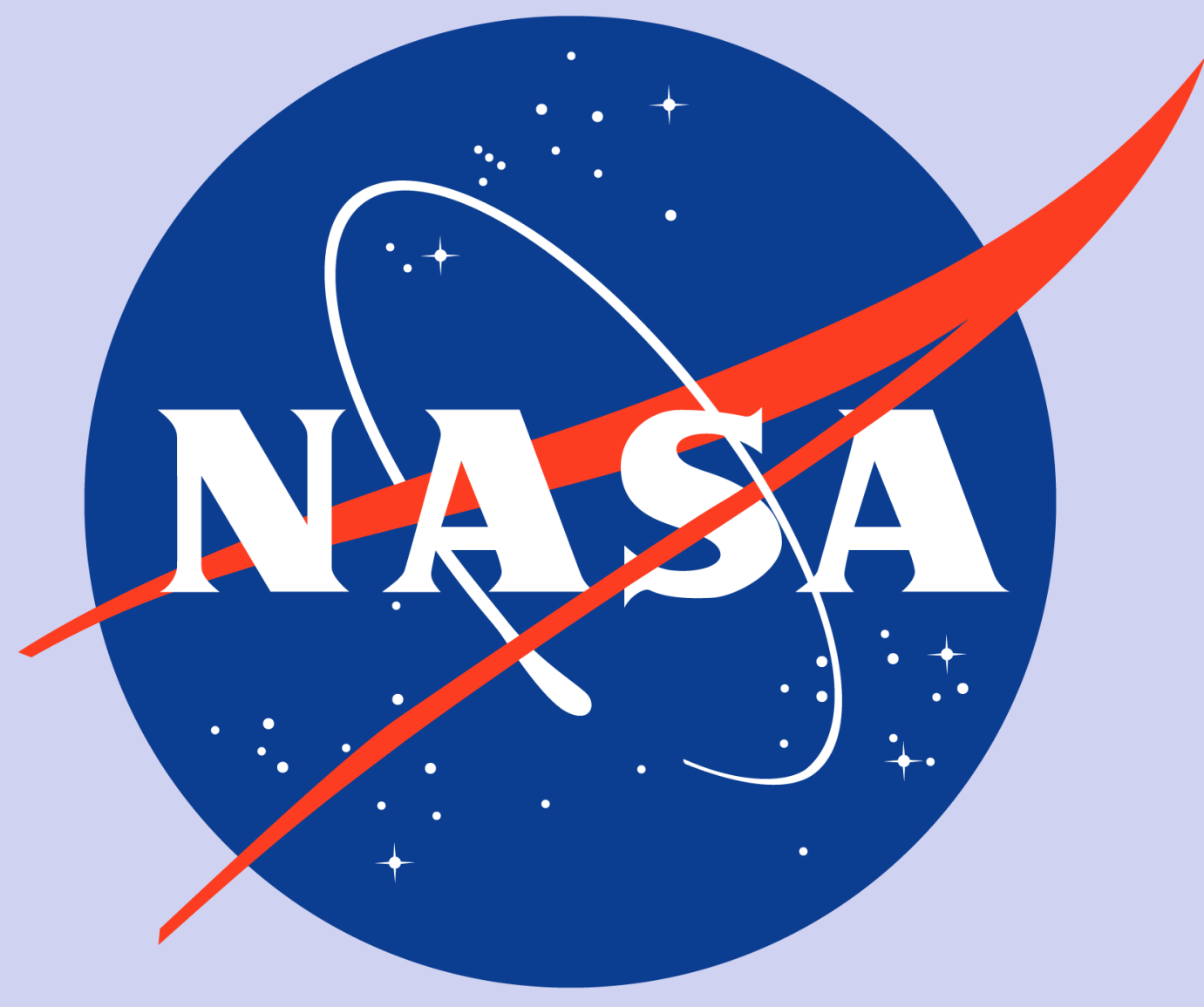
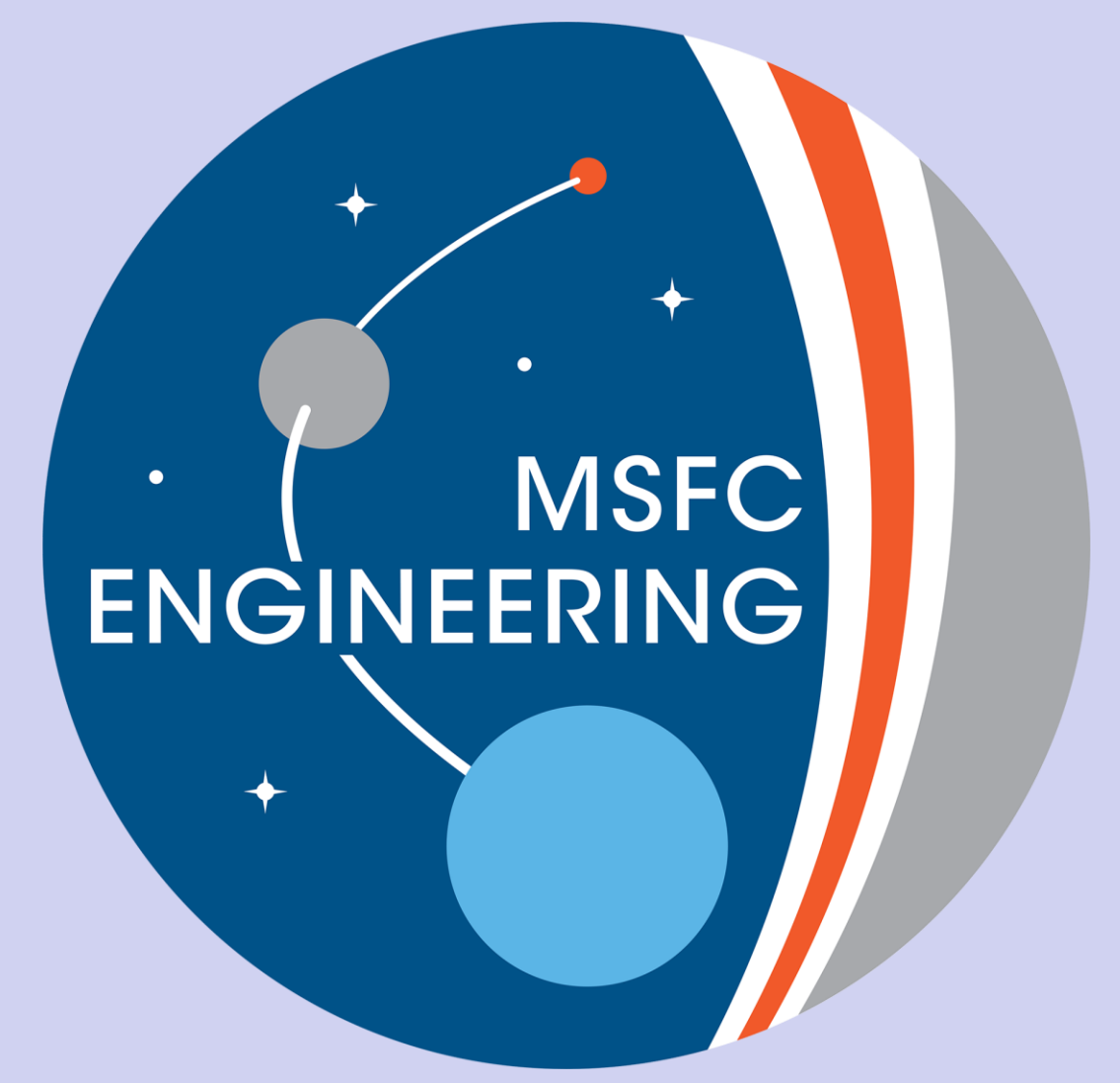




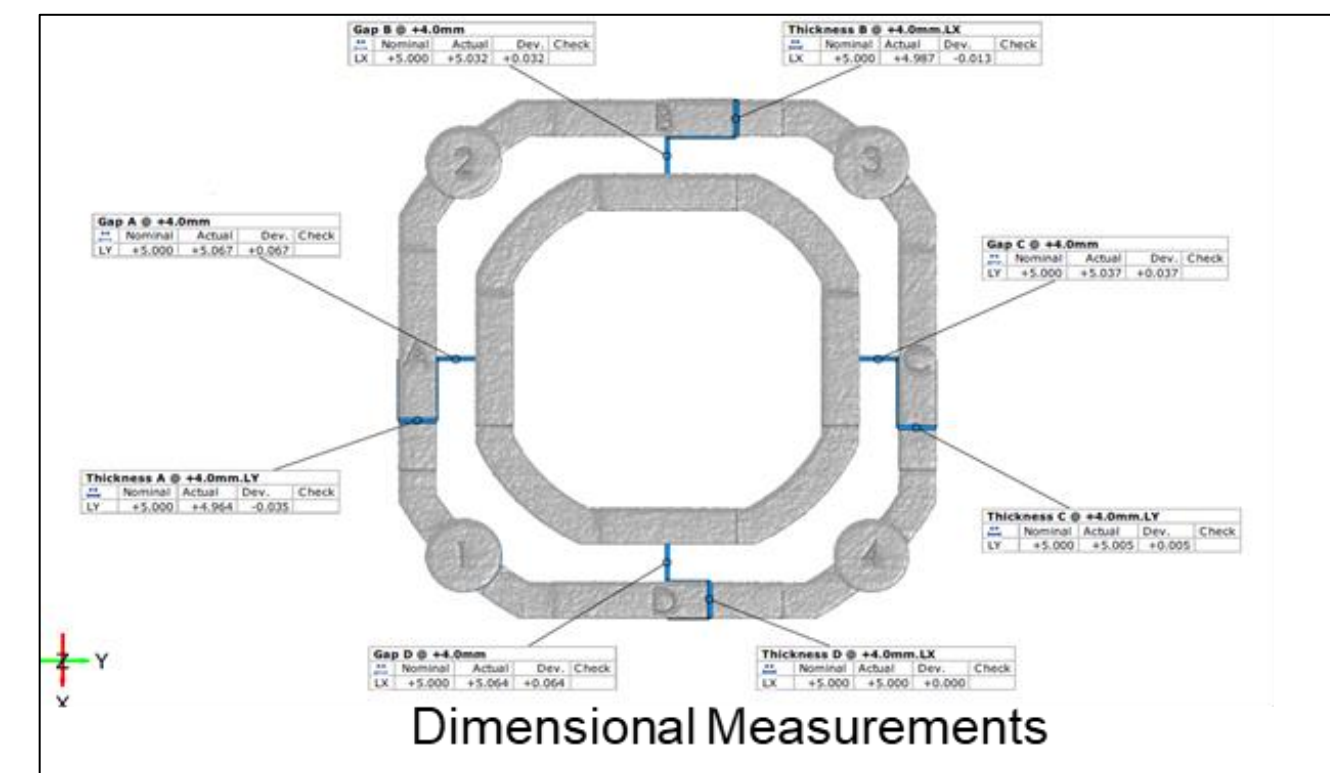
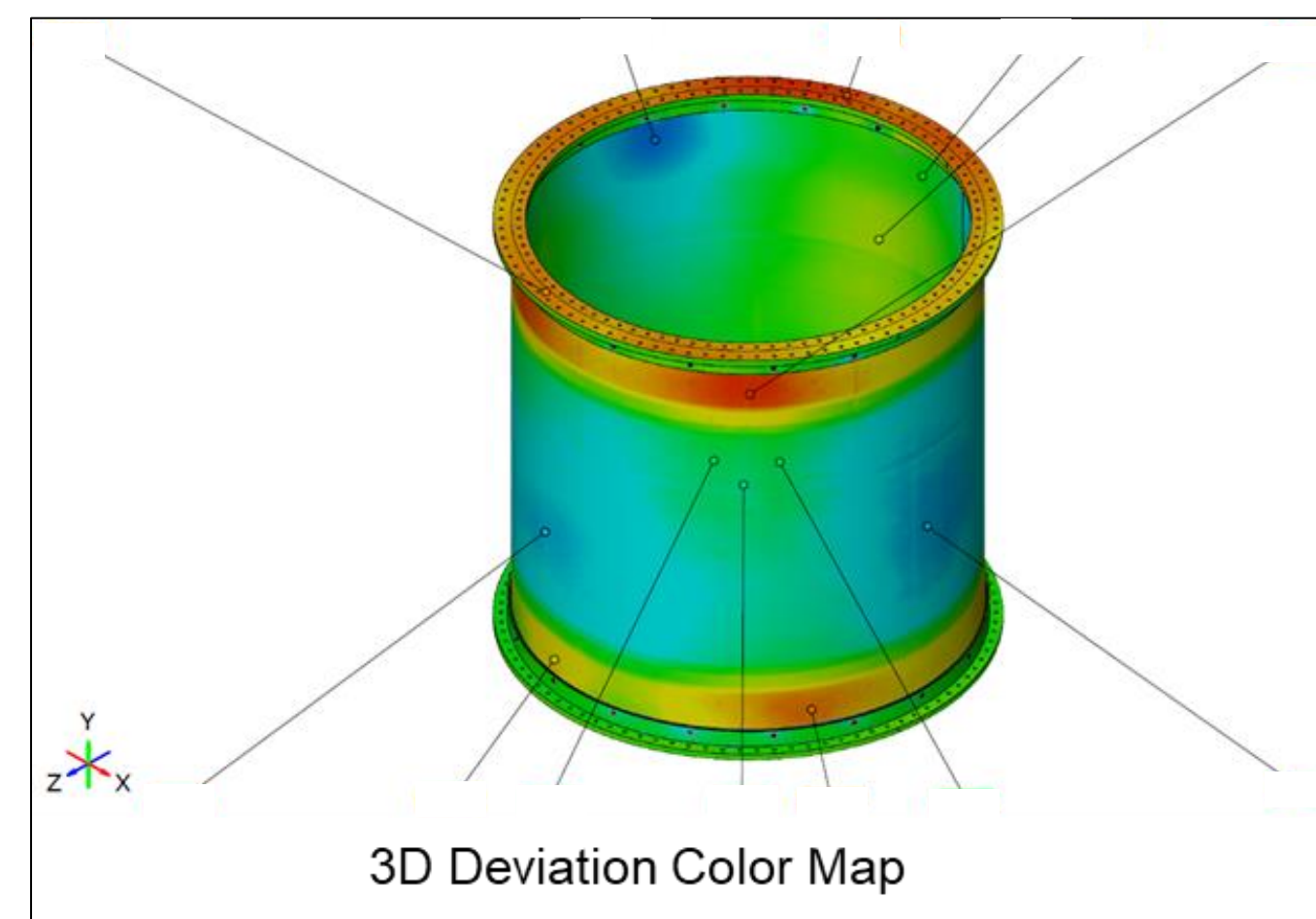
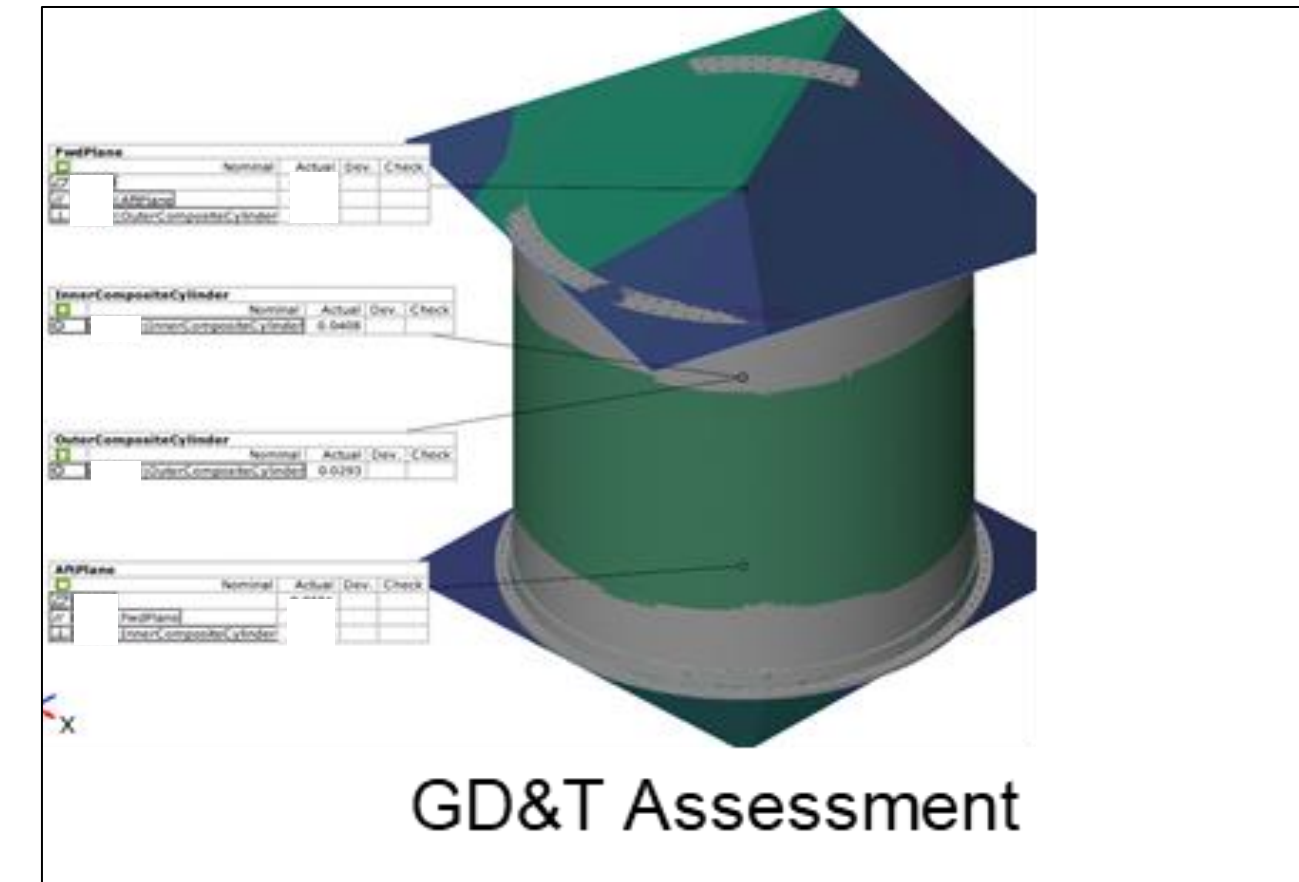
3D Scanning Laboratory

NASA Marshall Space Flight Center
Engineering Directorate, Materials & Processes Lab
John Ivester, Advanced Manufacturing Branch – EM42



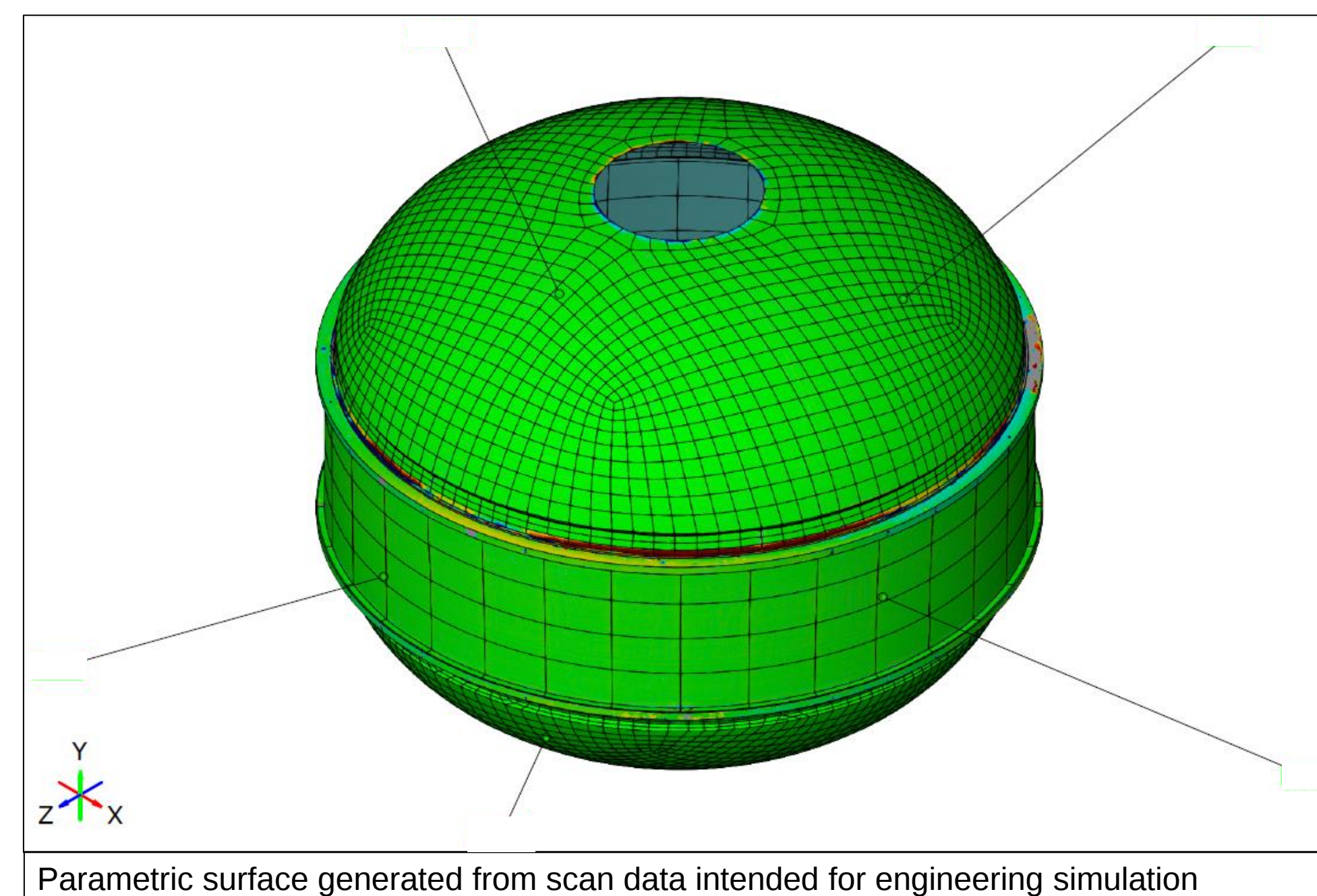
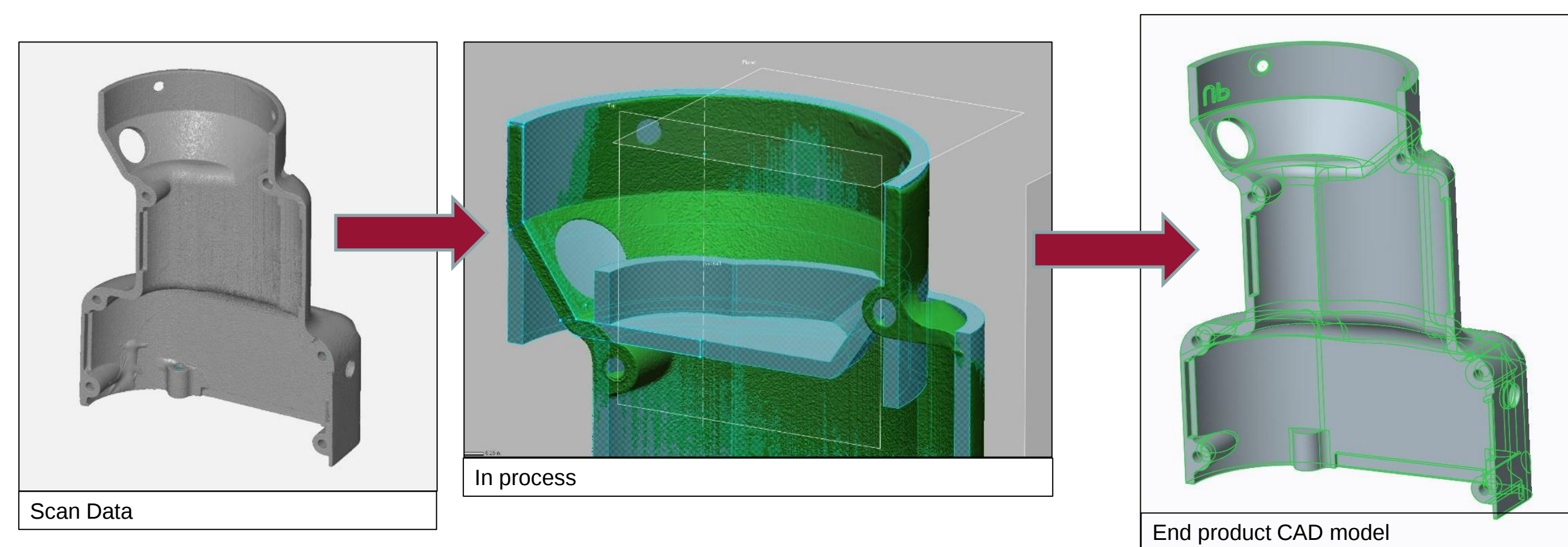
Inspection

- Surface Comparisons
- GD&T Assessment
- Basic Dimensional Measurements



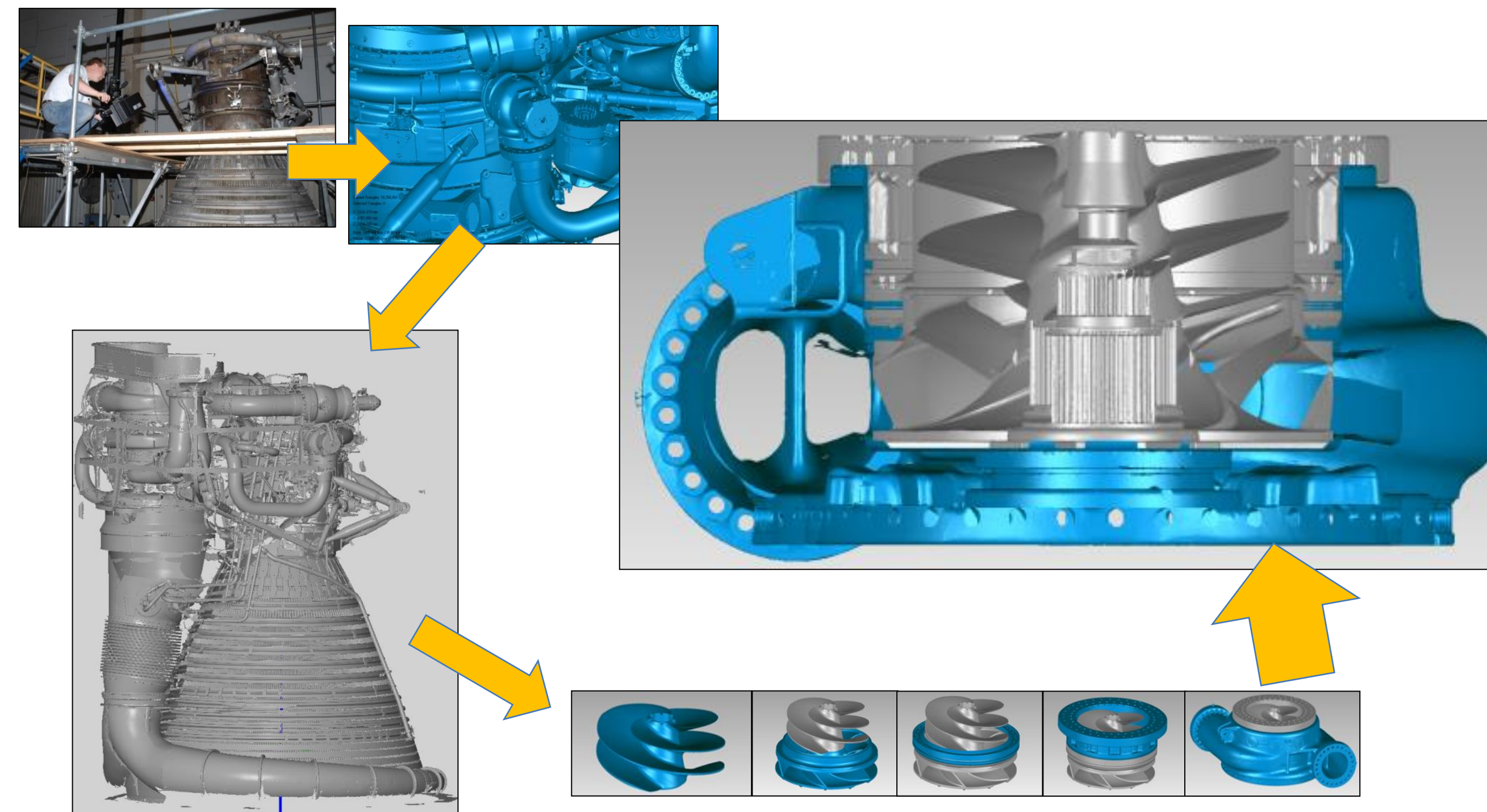
Reverse Engineering

- Developing parametric data from 3D scan data



Digital Assemblies

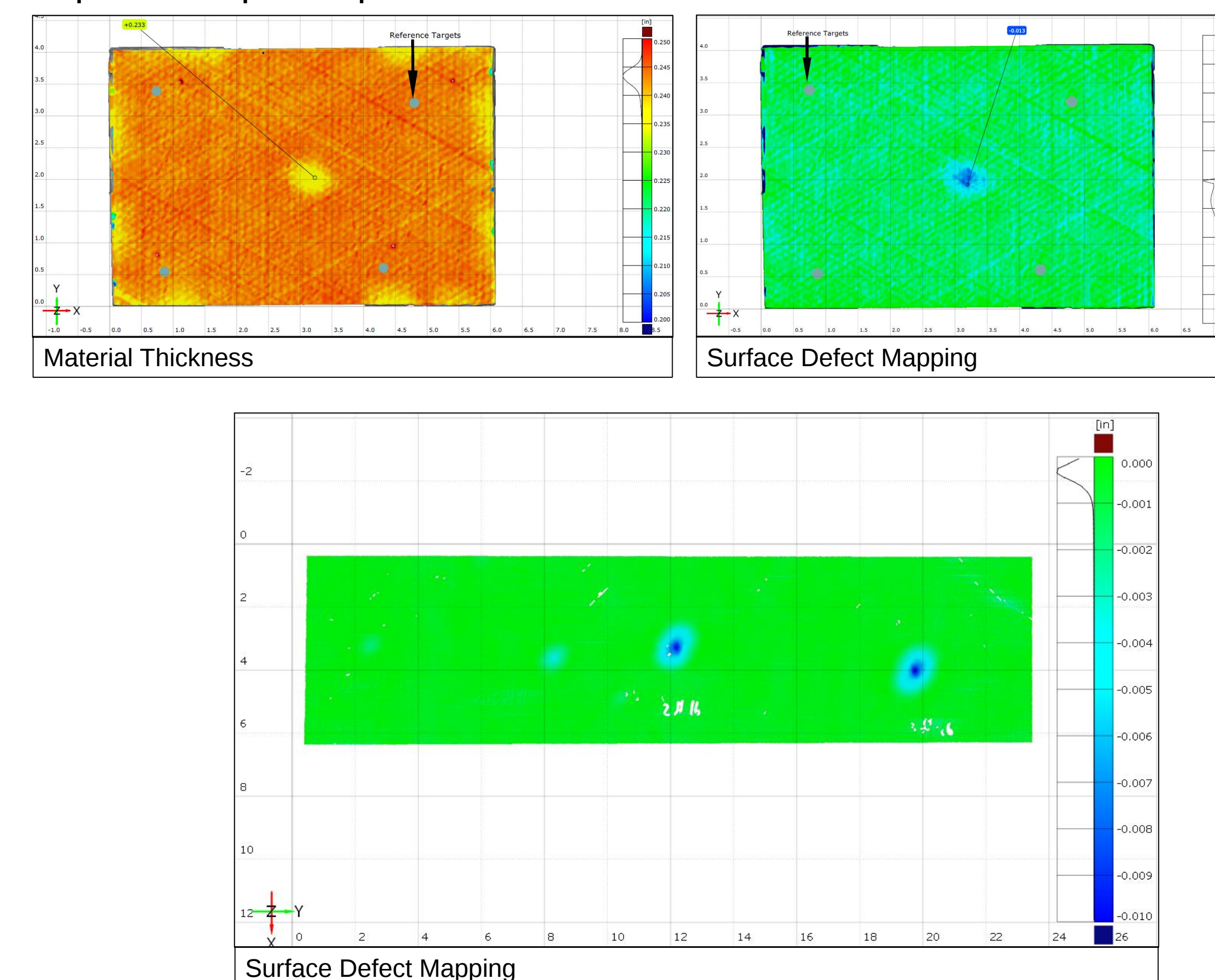
- Digital Assembly of F1 Engine
 - Perform photogrammetry and scan assembled engine
 - Disassemble and scan individual components
 - Digitally reassemble the components into their as-assembled positions
- Internal Geometry can now be measured



Pre/Post Testing Inspection

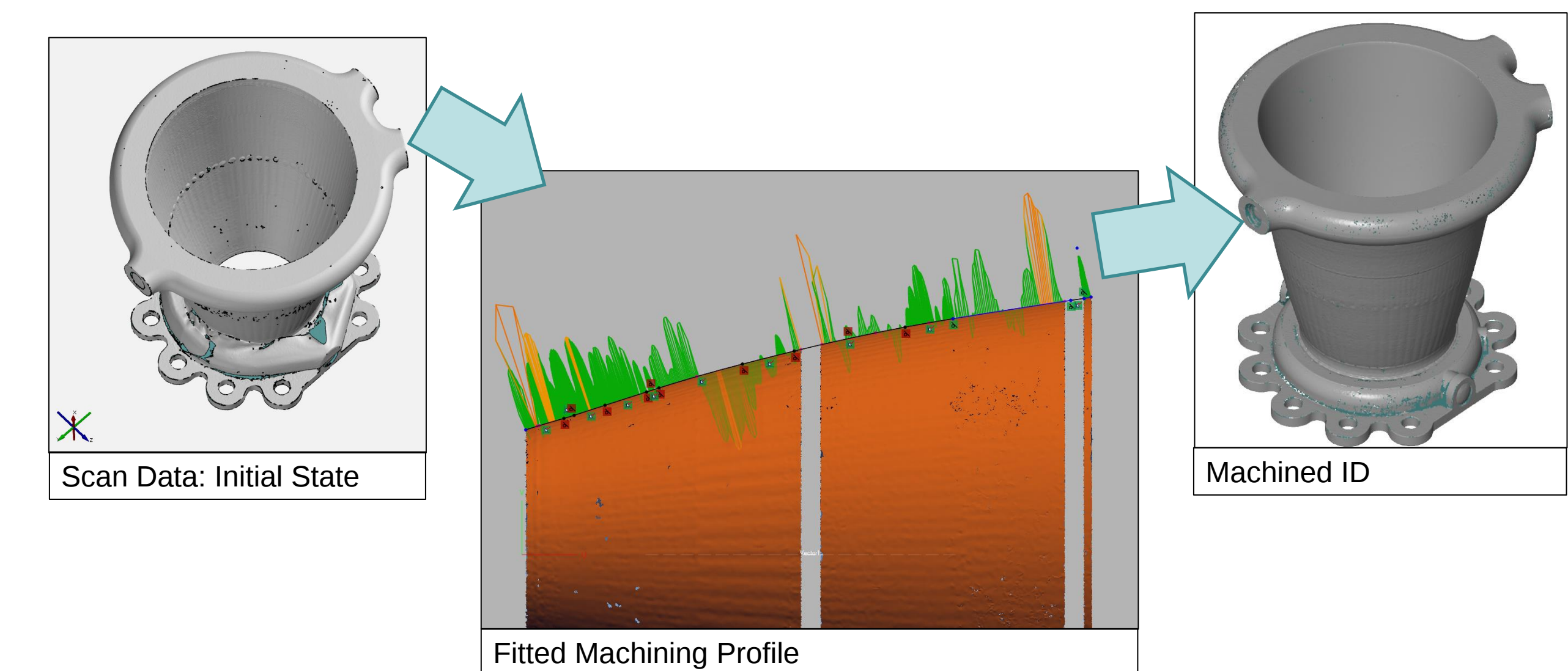
- Part is scanned before and/or after testing

Impact Sample Inspections



Manufacturing/Process Development

- Match Machining
 - Driving machining process with 3D scanning



- Reverse Projection
 - Using 3D scanning to drive hardware alterations

