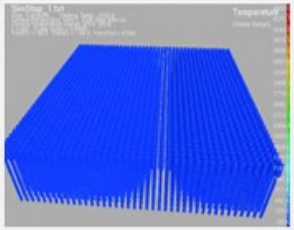
# ALPHASTAR ICME TECHNOLOGY APPLIED TO ADDITIVE MANUFACTURING

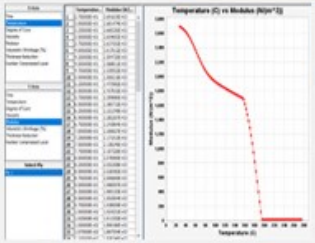
## Melt Pool Engineering

- Calculate dynamic changes in melt pool based on process parameters (e.g., power, speed)
- Identify parameter configurations that maximize build quality of PBF parts



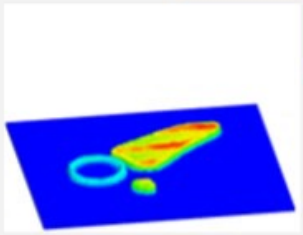
## Material Modeling

- Develop materials for AM specific applications
- Generate anisotropic properties for material qualification
- Predict mechanical properties for metals i.e., fracture/fatigue



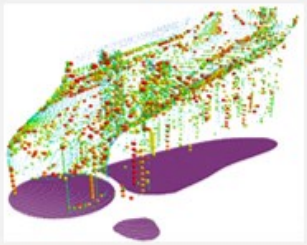
## Thermal Process Simulation

- Toolpath driven thermal history
- Considers g-code, and variable print parameters



## Raster Air Gaps Assessment

- Predict slicing or coverage gaps from toolpath raster
- Map macro-voids to structural analysis
- Used for process simulation and in-service load analysis



## Mechanical Build Simulation

- Map transient temperature distributions to FE mechanical model
- Predict defects during print, and effect of defects on part performance

Simulation

3D Scan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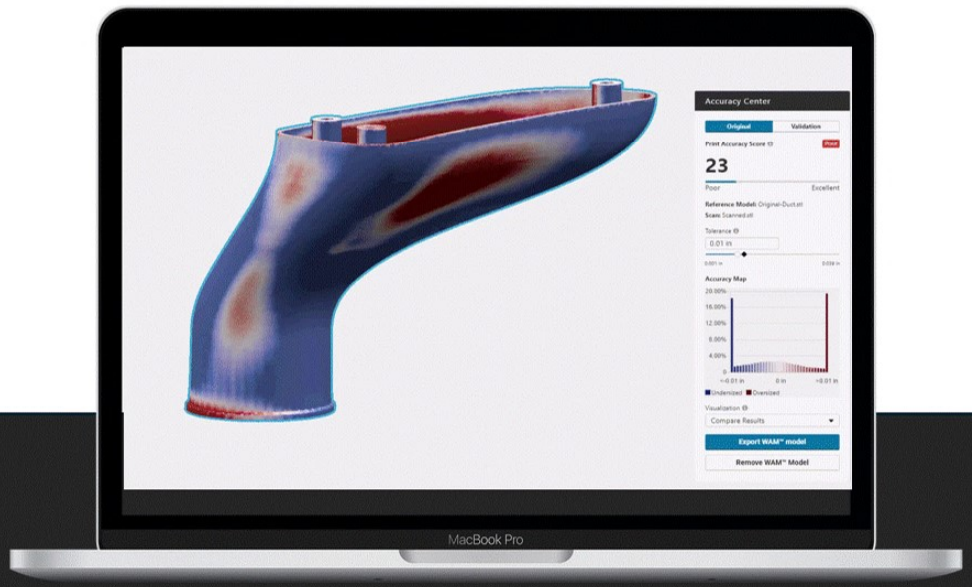
# Predictive Digital Twin

Simulation of Deformed Shape Compared to 3D Scanned Data

## Heatmap of Simulation


## Heatmap of Printed Part




**Stratasys F900 ULTEM 9085 Duct Model**