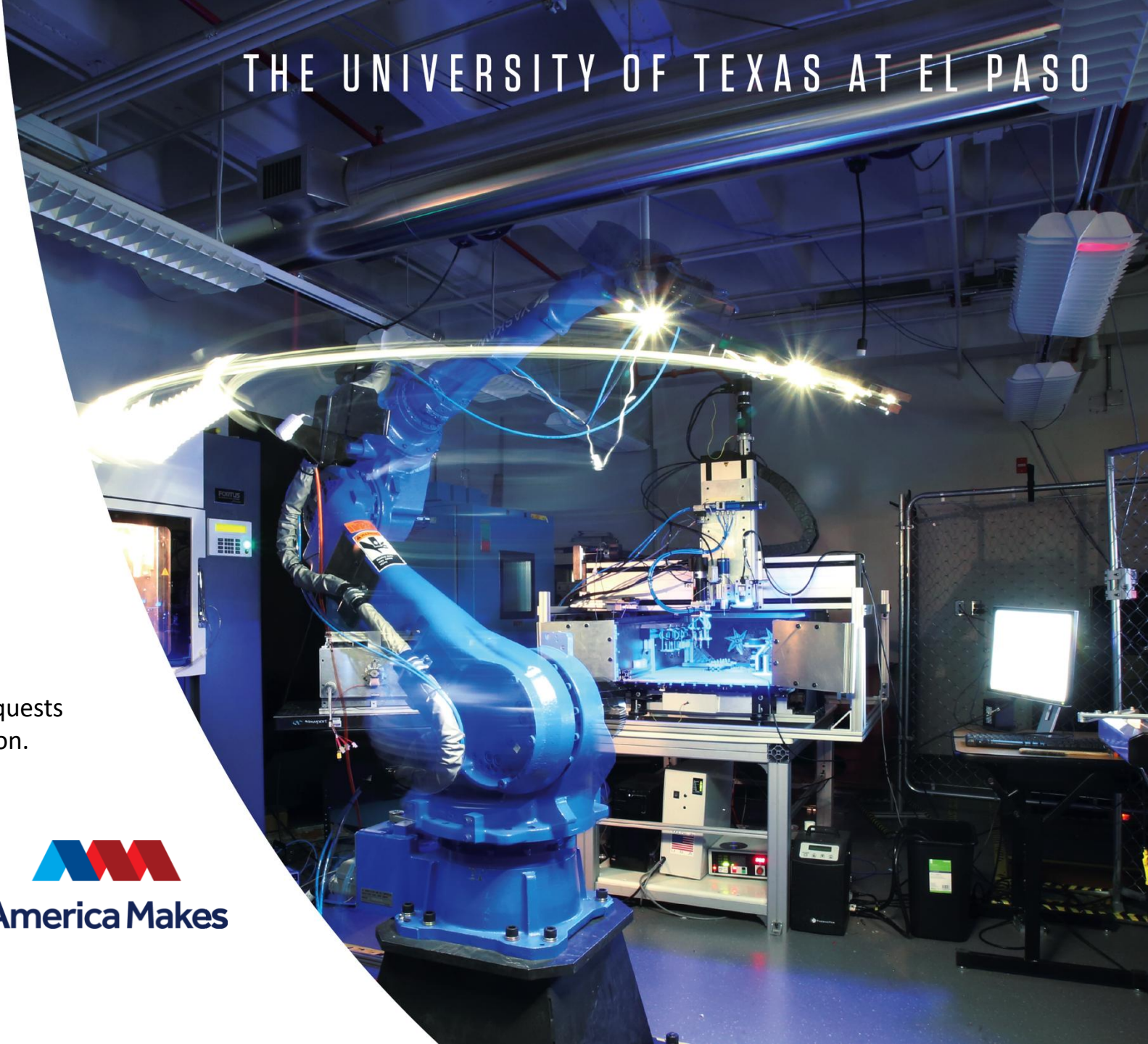


Artifact 32 Section Views

Fernando Sepulveda

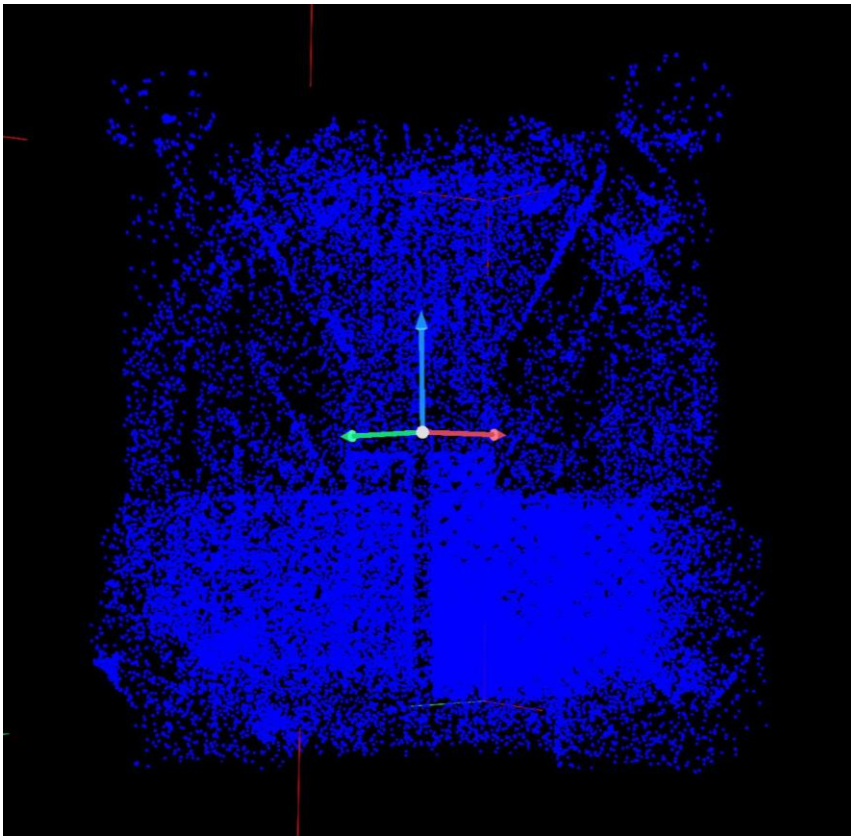
Undergraduate Research Assistant

Distribution Statement D: Distribution authorized to the Department of Defense and U.S. DoD contractors only; Administrative or Operational Use; 10-28-2022. Other requests shall be referred to the W.M. Keck Center for 3D Innovation.

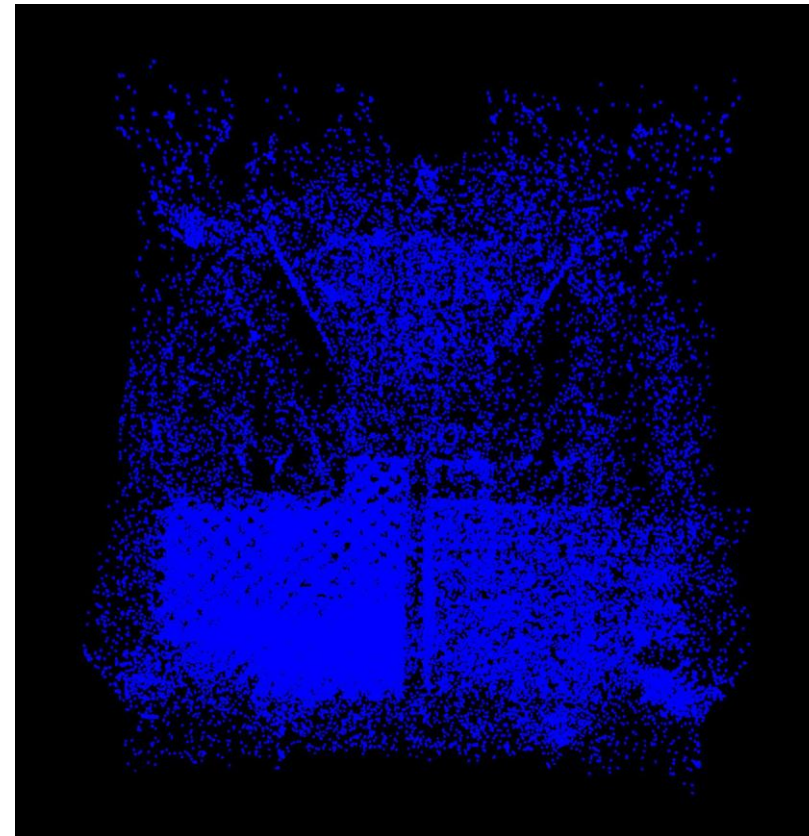


Porosity Point Cloud View

Porosity analysis>Create>ROI from defect mask>Convert To>Surface Mesh



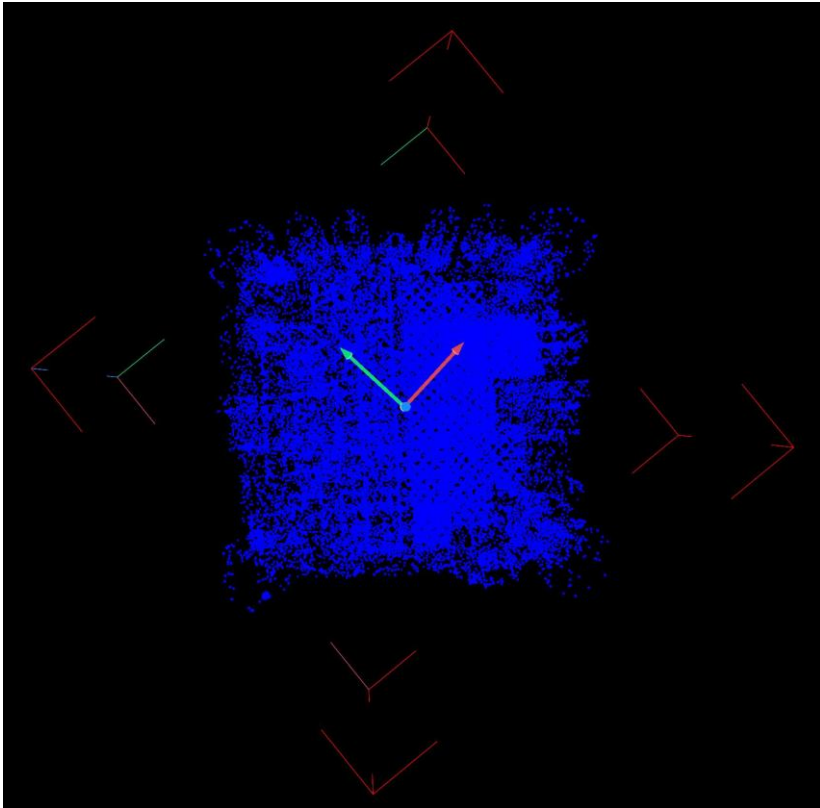
Back View



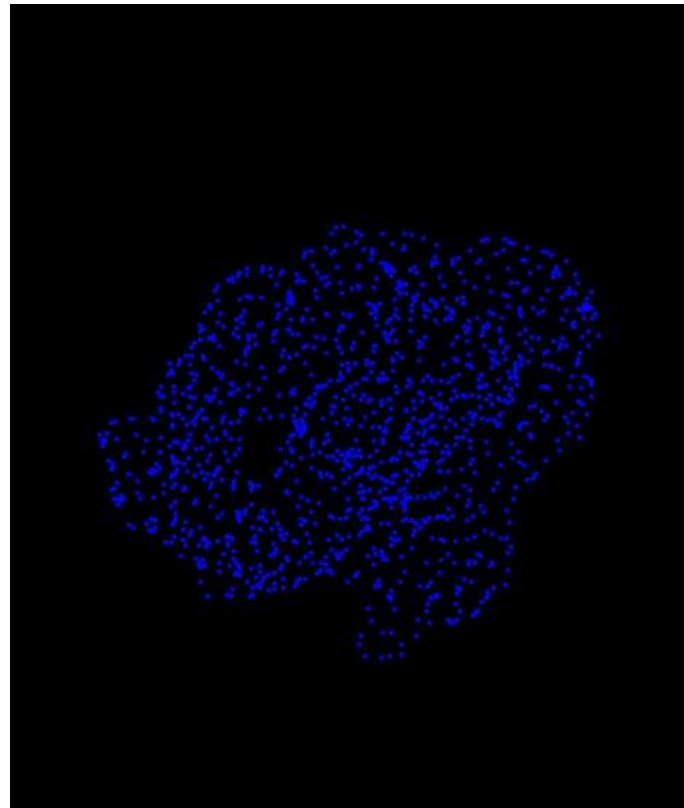
Front view

Porosity Point Cloud View

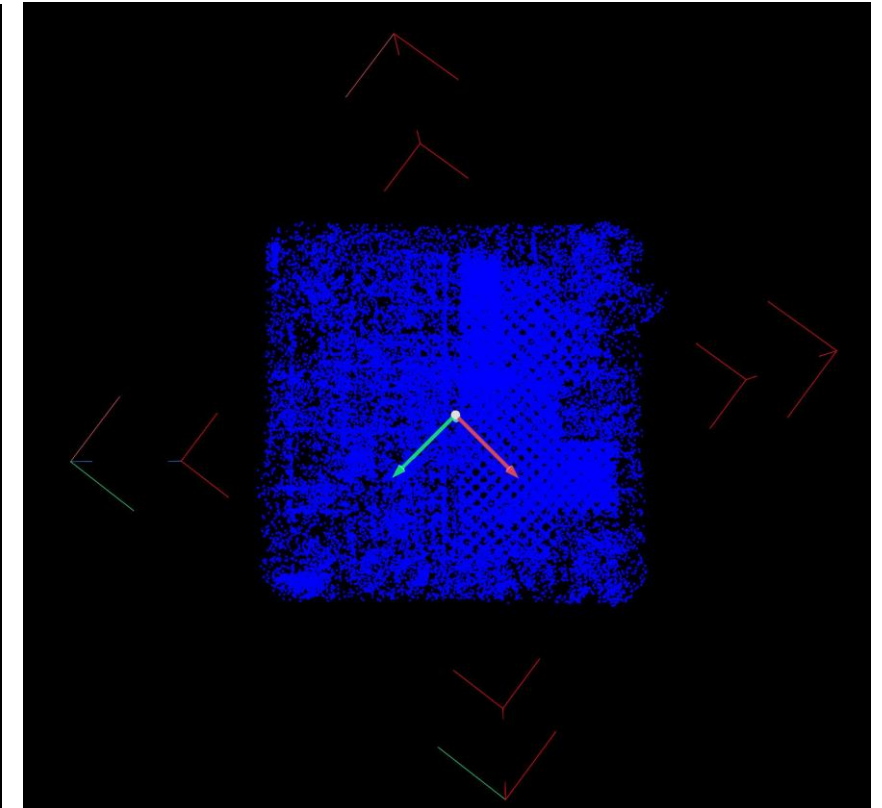
Goal: Identify importing process for csv to create point cloud and regions



Top view



Zoom pore representation



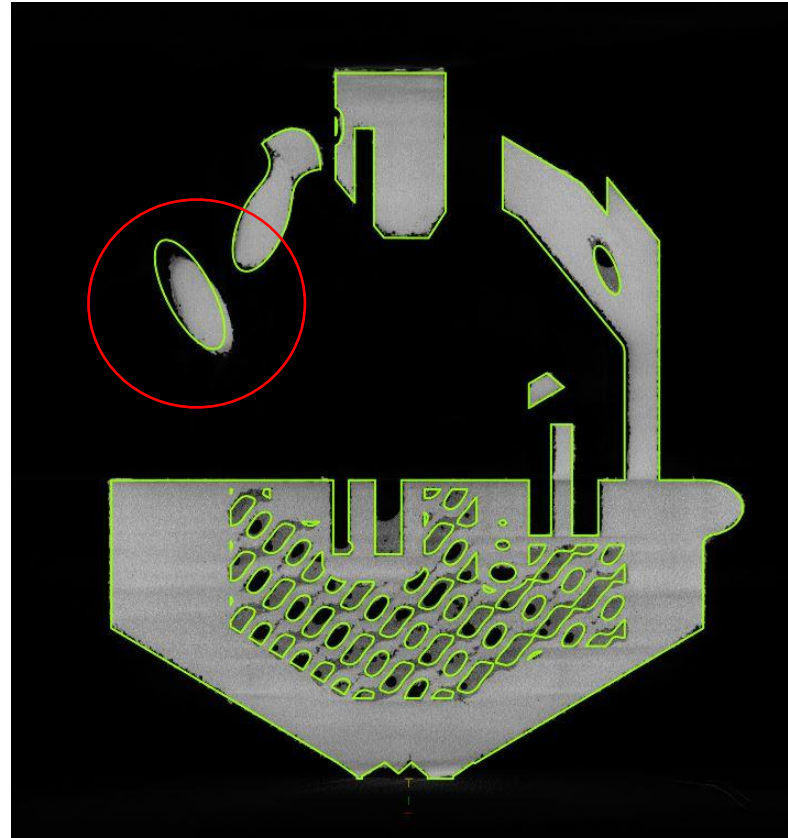
Top view

X-axis

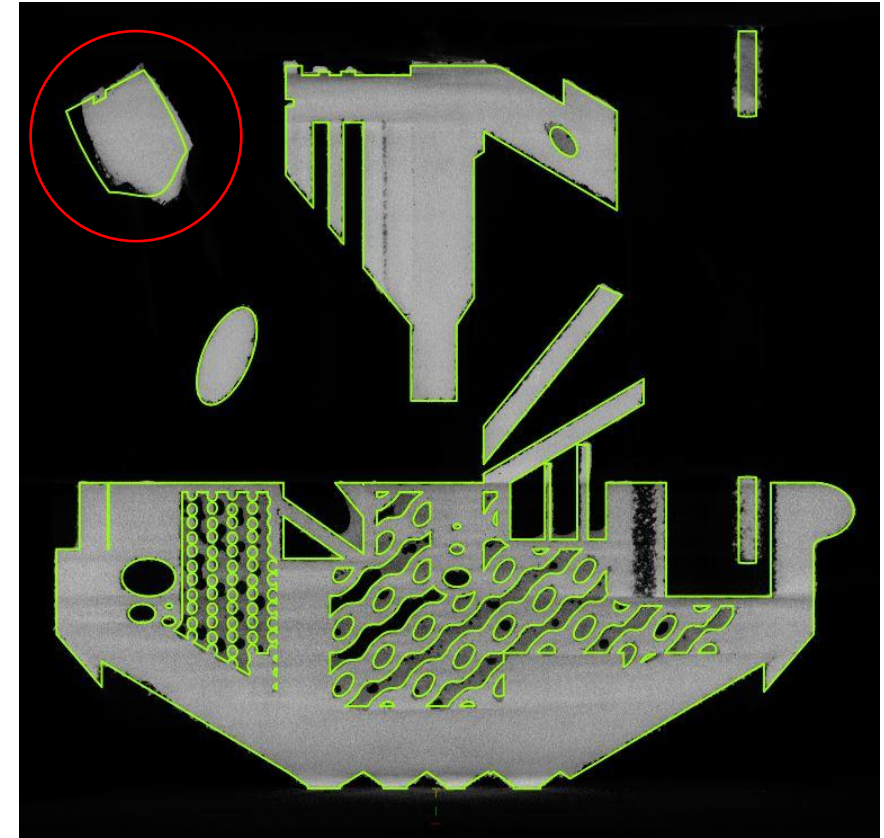
Red area indicates Bar#10



Bottom



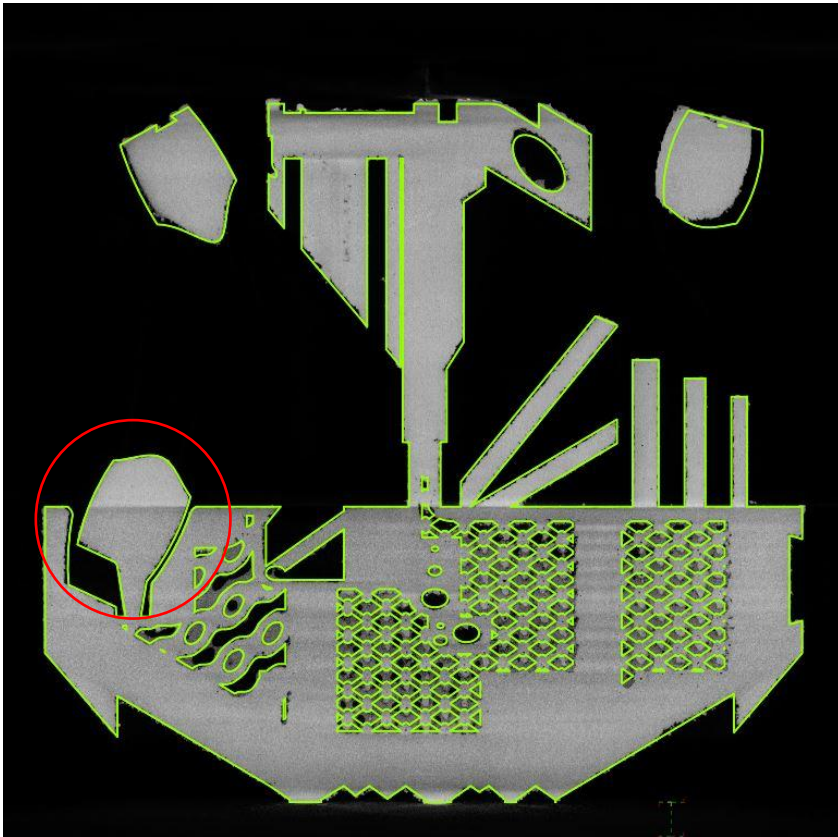
Middle



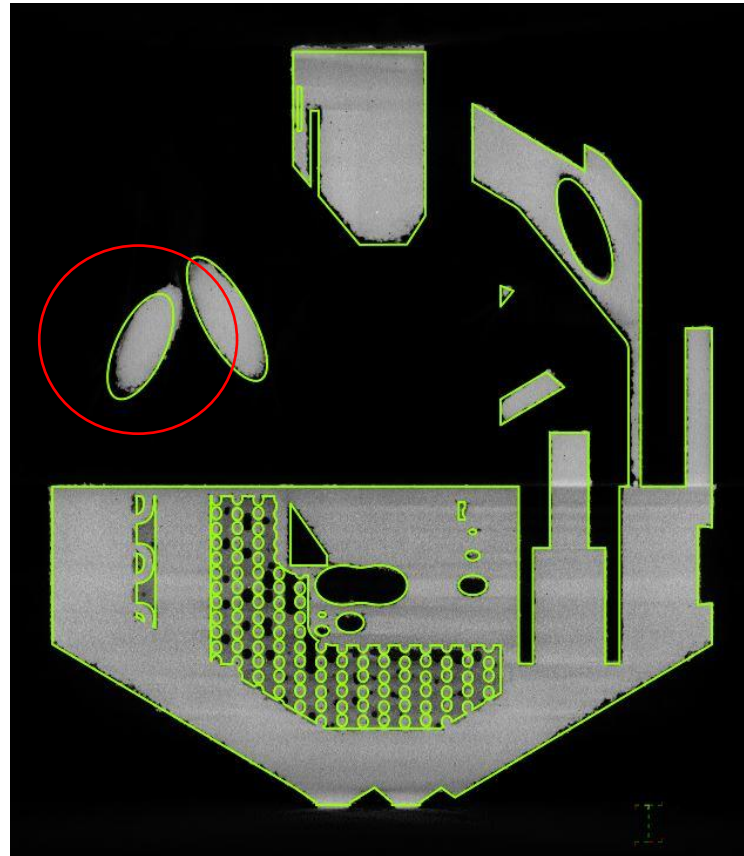
Top

Y axis

Red area indicates Bar#10



Bottom



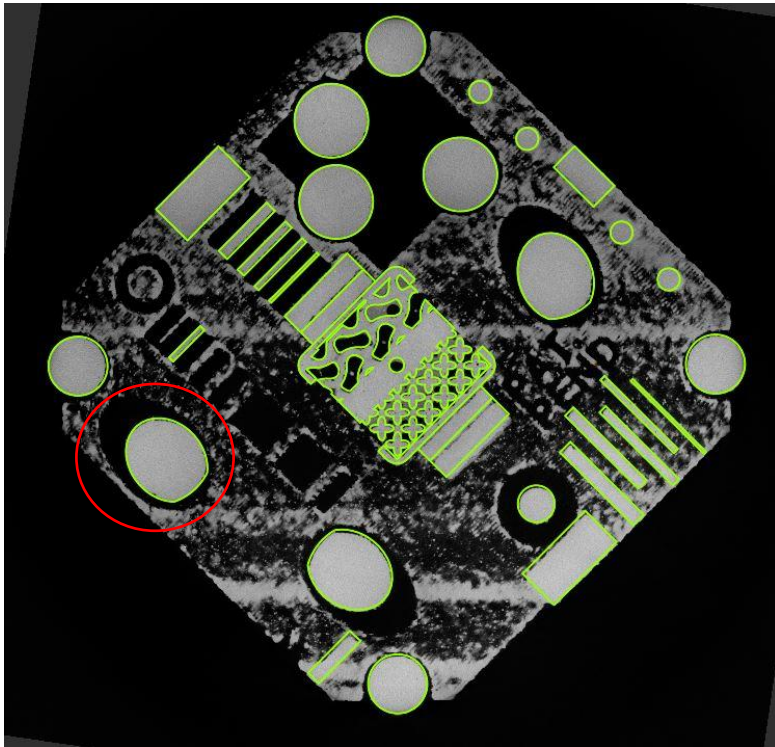
Middle



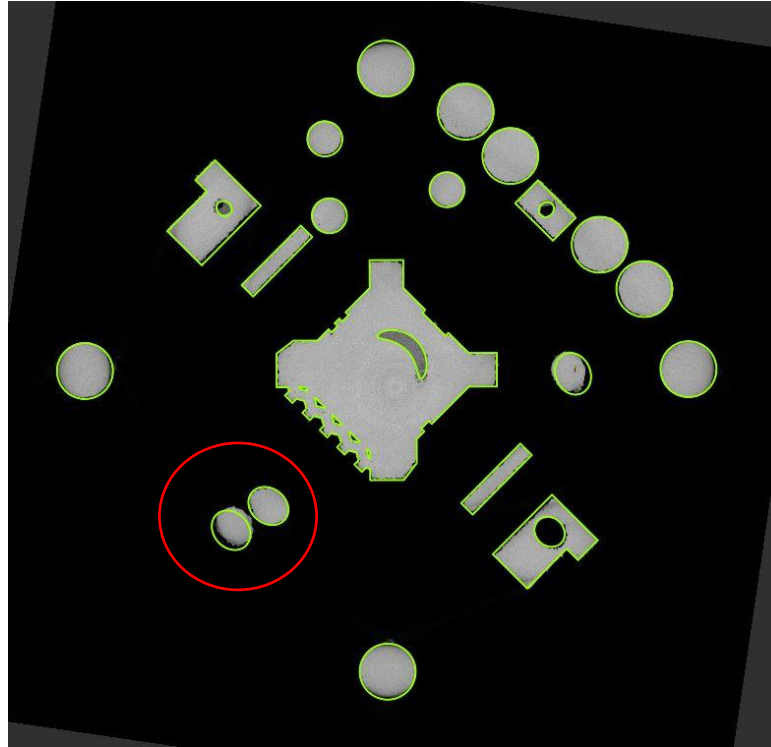
Top

Z axis

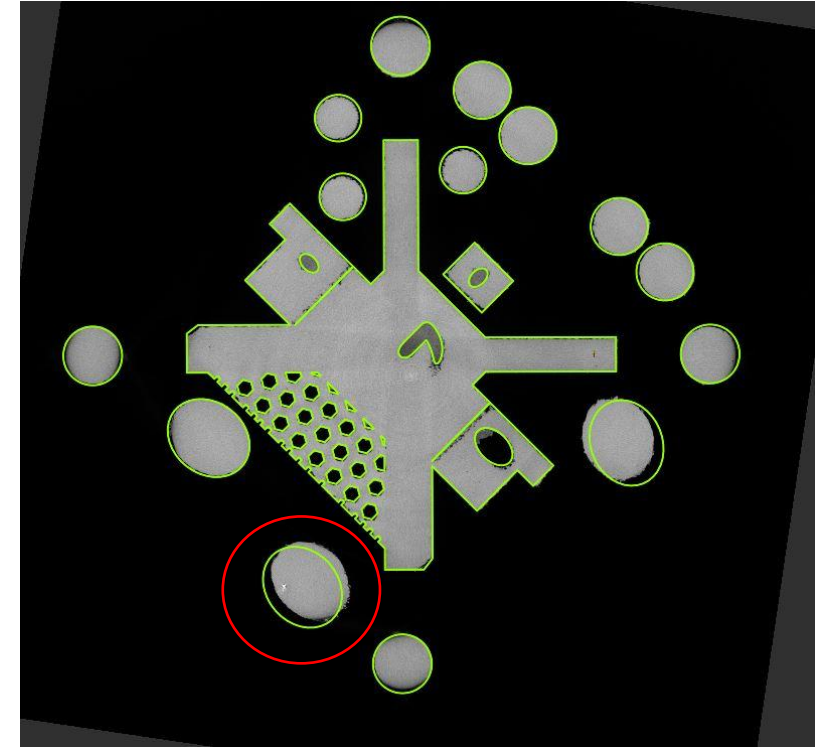
Red area indicates Bar#10



Bottom



Middle



Top

Time complexity and result quality

Time Complexity

The Nominal to Actual Comparison takes an elongated time to compile however can be reduced using faster computer

Avg on 500 GB RAM: ~3hrs

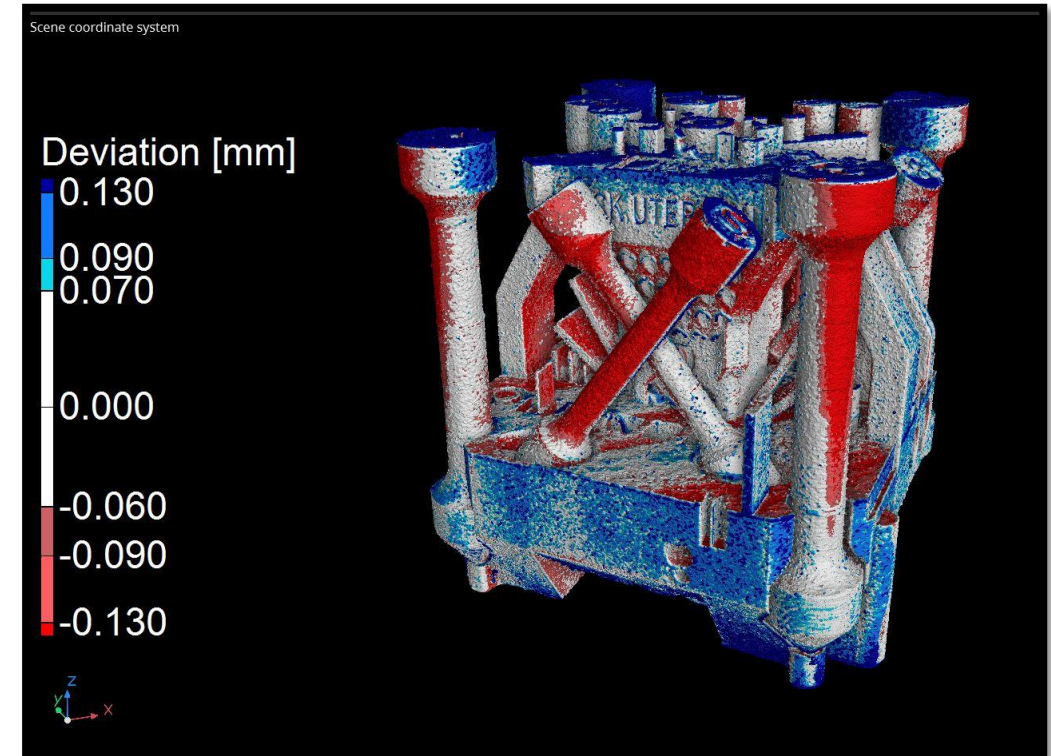
Avg on 1000 GB RAM: ~40 min

Result quality:

Over: 0.130+ (blue) (overbuilt)

Between: -0.130 & .130 (white)(Acceptable range)

Under: -0.130- (red) (underbuilt)



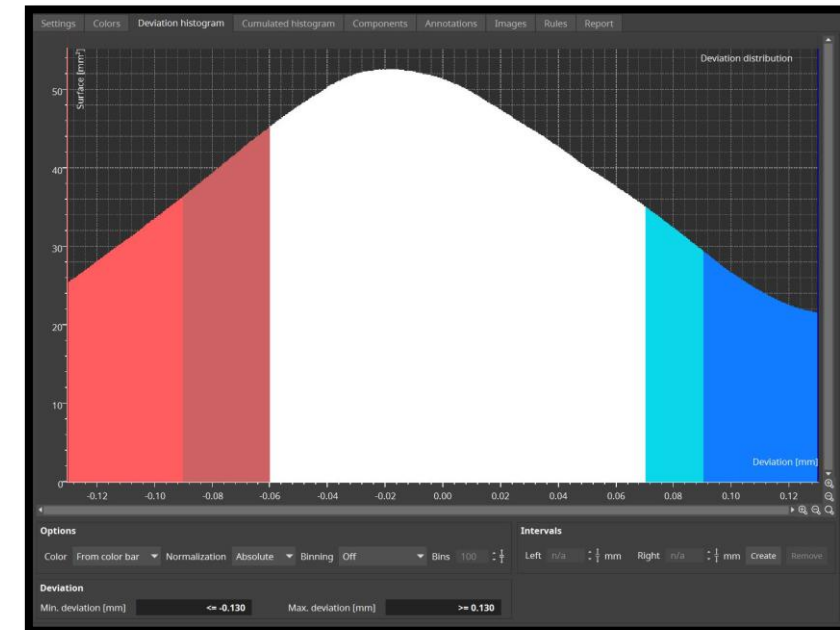
Visual Demonstration of N/A comparison
Showing deviation of build volume in mm

Comparing data

- After the analysis is compiled, the histogram, data set, and visual representation can be used to compare results among different artifacts
- Results reveal how the print is influenced by factors such as laser intensity, flow, etc.

Settings	Colors	Deviation histogram	Cumulated histogram	Components	Annotations	Images	Rules	Report
X Component max. deviation >= 0.130 mm Click to add a filter or search criterion								
	Pos. x [mm]	Pos. y [mm]	Pos. z [mm]	Component surface [mm²]	Component min. deviation [mm]	Component max. deviation [mm]	Description	
1	-25.349	0.870	-6.150	0.04	0.060	>= 0.130		
2	-22.544	2.850	-4.945	15.81	<= -0.130	>= 0.130		
3	-20.932	3.877	24.784	331.65	<= -0.130	>= 0.130		
4	4.189	22.833	-0.242	33044.66	<= -0.130	>= 0.130		
8	-25.353	0.781	-6.796	13.59	-0.117	>= 0.130		
17	-23.385	3.622	-8.946	1.19	0.060	>= 0.130		
34	-24.392	2.867	-6.943	0.36	0.060	>= 0.130		
35	-25.238	1.248	-6.846	0.20	0.060	>= 0.130		
36	-25.272	1.085	-6.587	0.02	0.060	>= 0.130		
38	-24.709	2.495	-6.350	0.09	0.060	>= 0.130		
54	-24.175	3.055	-7.093	0.15	0.060	>= 0.130		
55	-23.677	3.438	-6.868	0.18	0.060	>= 0.130		
56	-24.165	3.084	-6.702	0.13	0.060	>= 0.130		
71	-23.724	1.400	-11.156	0.32	<= -0.130	>= 0.130		
72	-23.642	1.698	-11.064	0.05	0.060	>= 0.130		
79	-22.946	3.814	-6.994	0.13	0.060	>= 0.130		
87	-23.895	0.394	-4.397	0.03	0.060	>= 0.130		
89	-23.653	0.673	-3.866	0.02	0.060	>= 0.130		
102	-23.046	1.539	-11.687	0.23	<= -0.130	>= 0.130		
103	-23.098	0.628	-12.147	0.00	0.060	>= 0.130		
104	-23.177	-0.253	-12.059	0.40	<= -0.130	>= 0.130		
112	-23.511	-0.150	-11.723	0.10	<= -0.130	>= 0.130		
121	-23.525	-2.229	-10.373	0.05	0.060	>= 0.130		

Dataset of deviation



Deviation histogram