



world16



11th VR Summer Workshop
July 7th - 10th, 2020
ONLINE Remote



the colors of point-cloud

**Tools to manage and alter the colors of point-cloud data
within UC-Win/Road**

DONGSOO CHOI

**The point cloud data
show the complex shapes in detail.
The point cloud data is useful for intermediate
analysis and visualization within workflows,
as they are relatively fast and contain
attributes that model continuous data, such
as elevation and distance.**

This added tool is the effort to enhance UC-win/Road's ability to integrate the point cloud better. Also, make it more compelling tools that are not possible in other software.

Sample point cloud data shown with the dense points



**typical point cloud
with(out) color data**

Point Cloud data without color info but with intensity/ (.pts file)

ptsImport 0.48160000 -0.74810000 293.50030000 225 142 142 142

x 0.48160000 y -0.74810000 z 293.50030000 intensity 225 r 142 g 142 b 142

ptsImport 0.48100000 -0.74840000 293.50030000 209 141 141 141

x 0.48100000 y -0.74840000 z 293.50030000 intensity 209 r 141 g 141 b 141

ptsImport 0.48040000 -0.74870000 293.50040000 209 141 141 141

x 0.48040000 y -0.74870000 z 293.50040000 intensity 209 r 141 g 141 b 141

ptsImport 0.48090000 -0.74690000 293.50020000 225 142 142 142

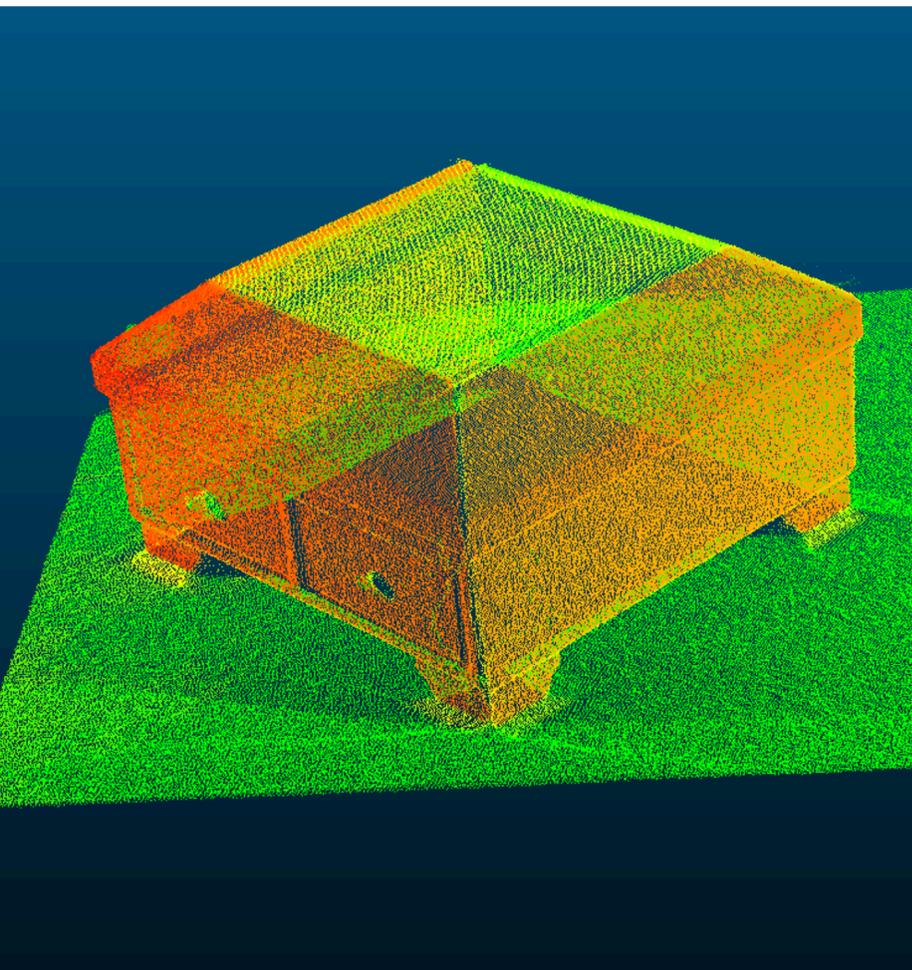
x 0.48090000 y -0.74690000 z 293.50020000 intensity 225 r 142 g 142 b 142

ptsImport 0.48020000 -0.74720000 293.50030000 193 140 140 140

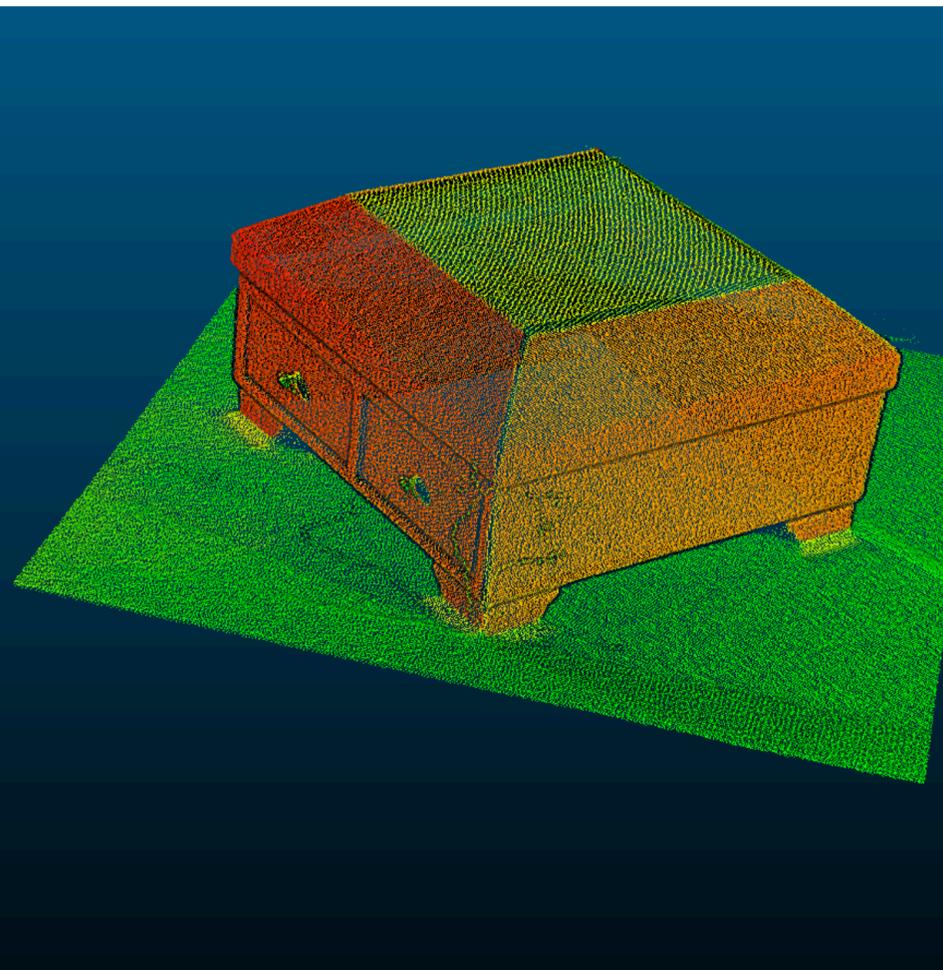
x 0.48020000 y -0.74720000 z 293.50030000 intensity 193 r 140 g 140 b 140

ptsImport 0.48180000 -0.74590000 293.50050000 225 142 142 142

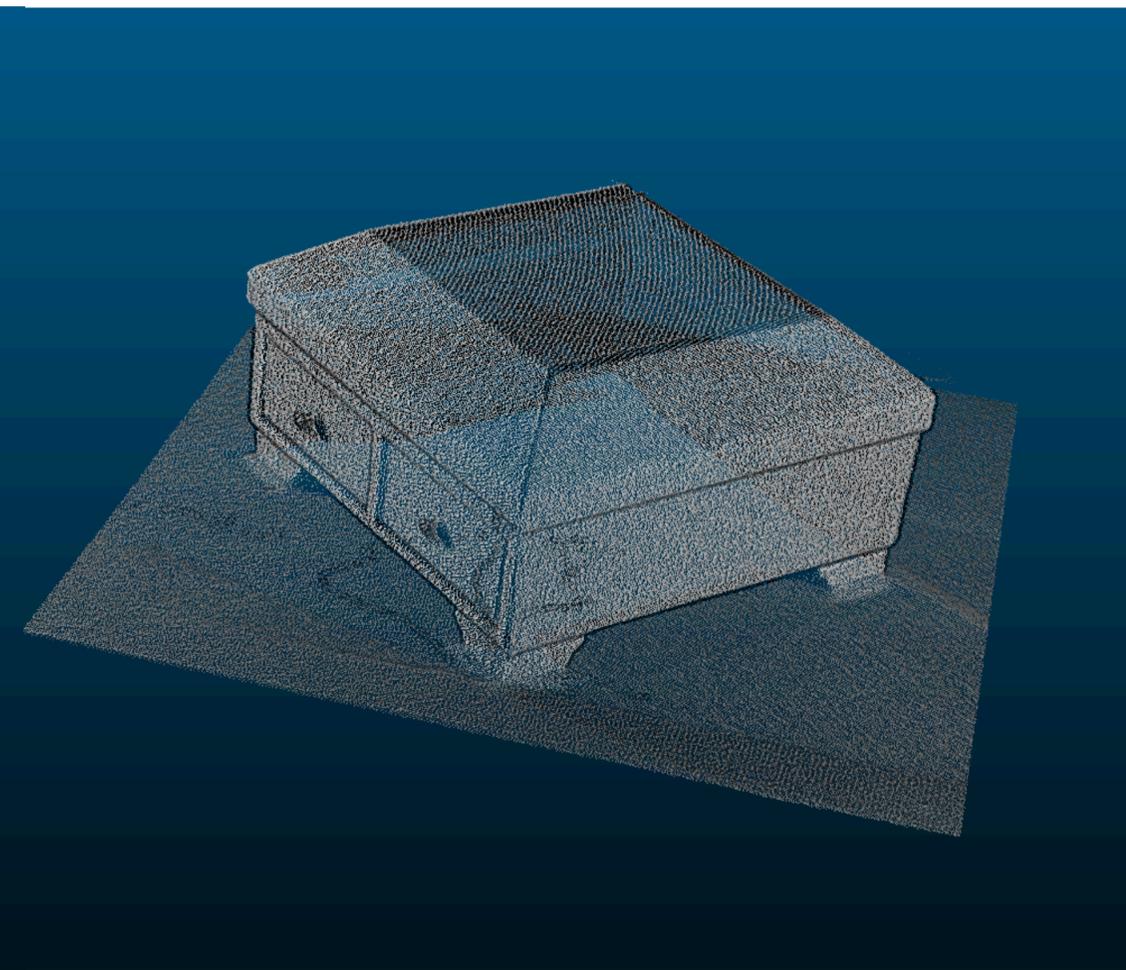
x 0.48180000 y -0.74590000 z 293.50050000 intensity 225 r 142 g 142 b 142



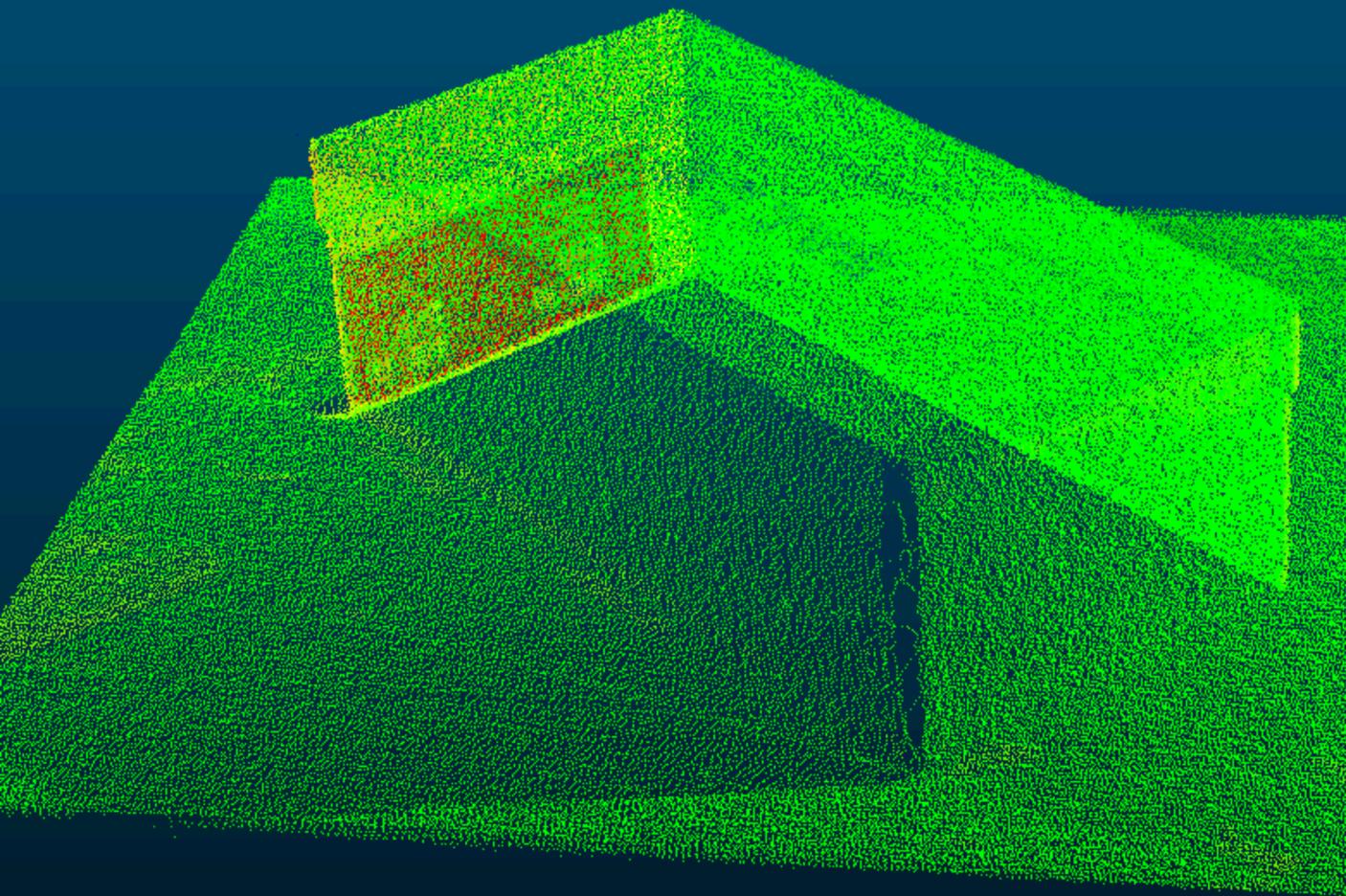
data with intensity



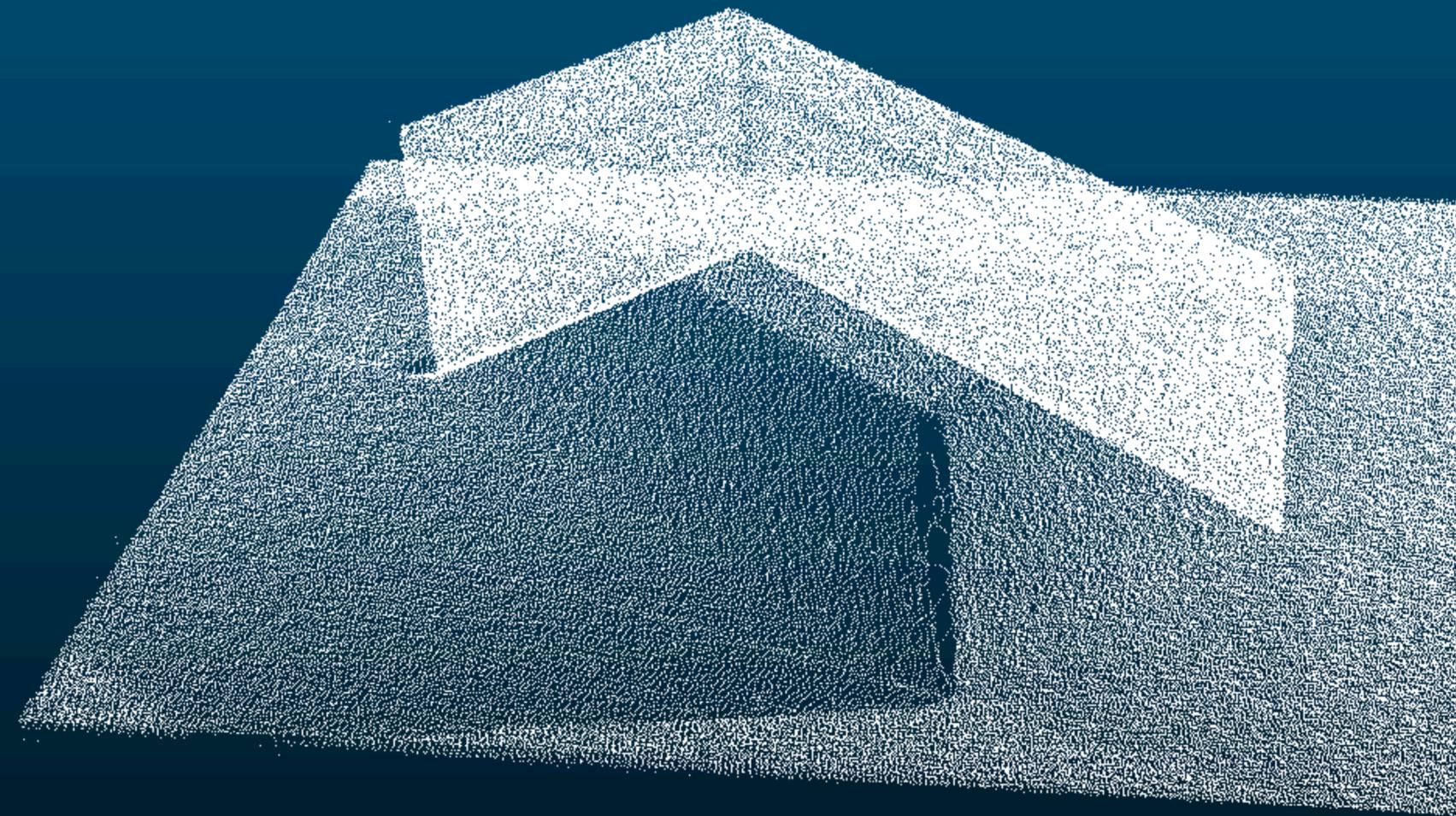
data with intensity
and shading



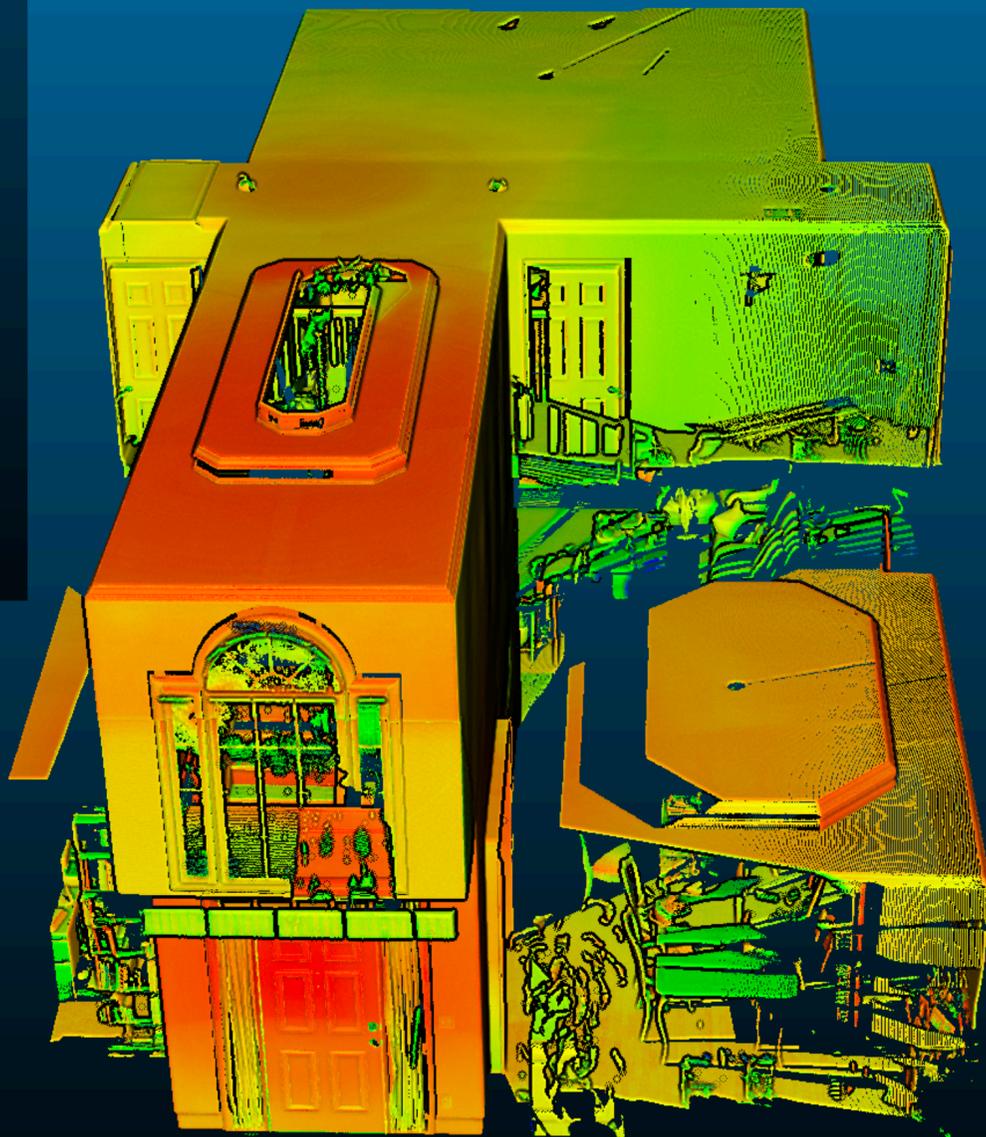
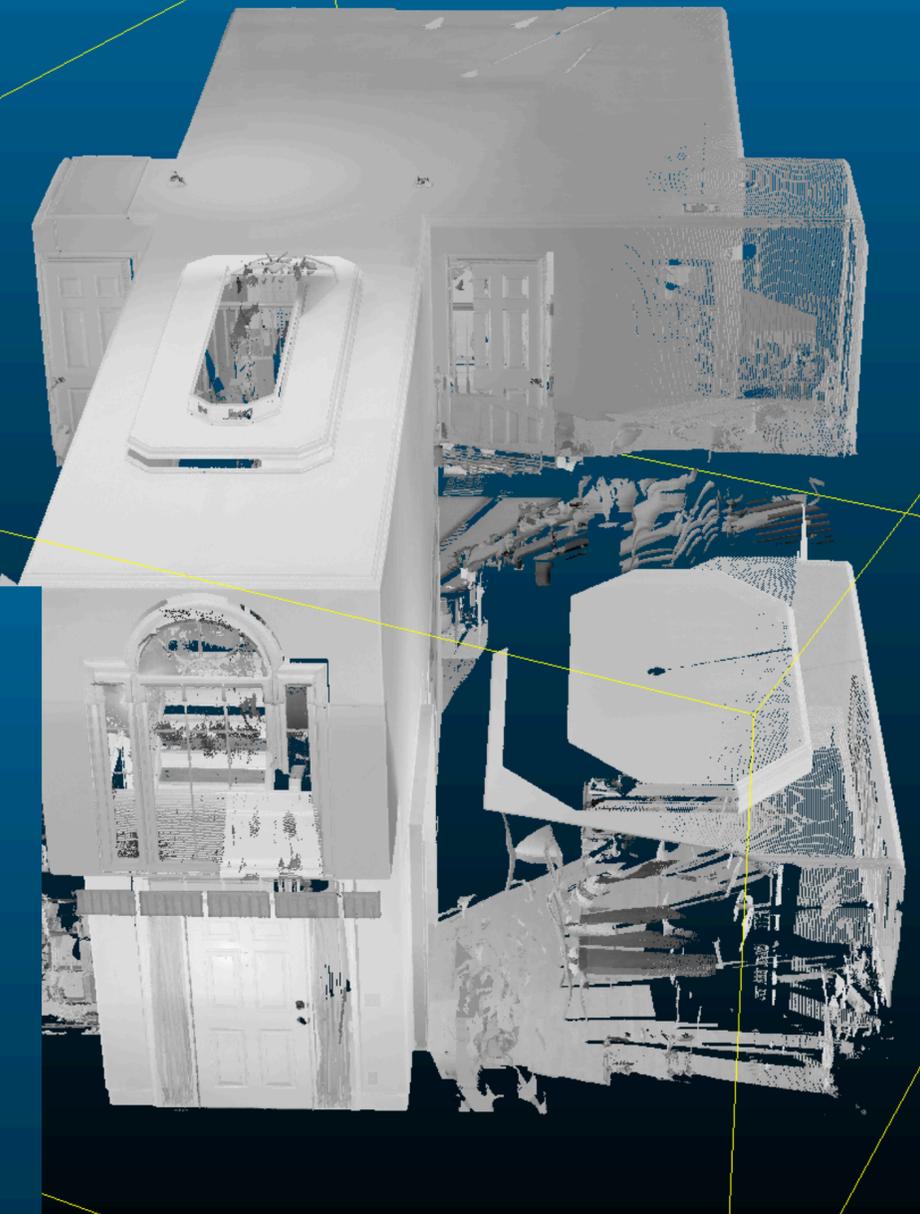
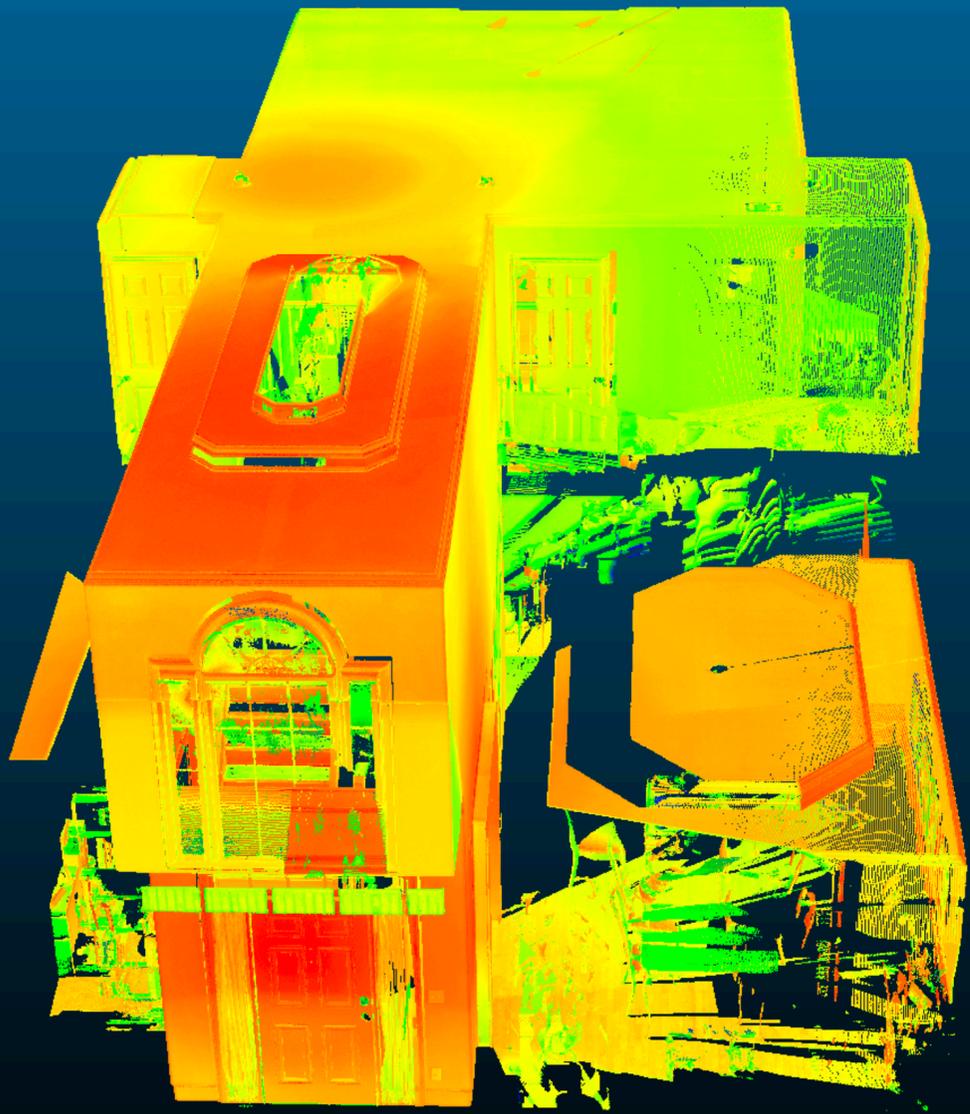
data without intensity
but with shading



data with intensity



data without intensity



data with intensity

data with intensity
and shading

data without intensity
but with shading

data with shading

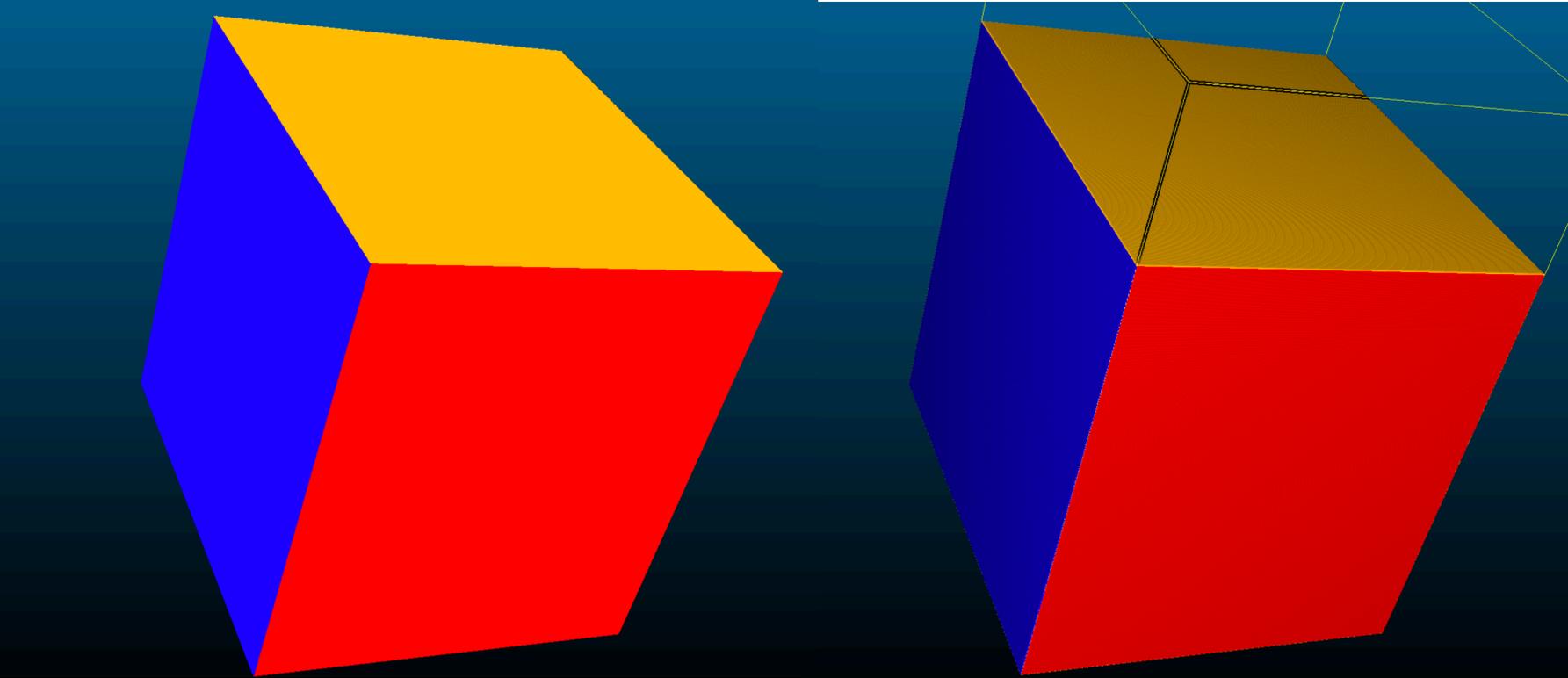


data without intensity nor shading



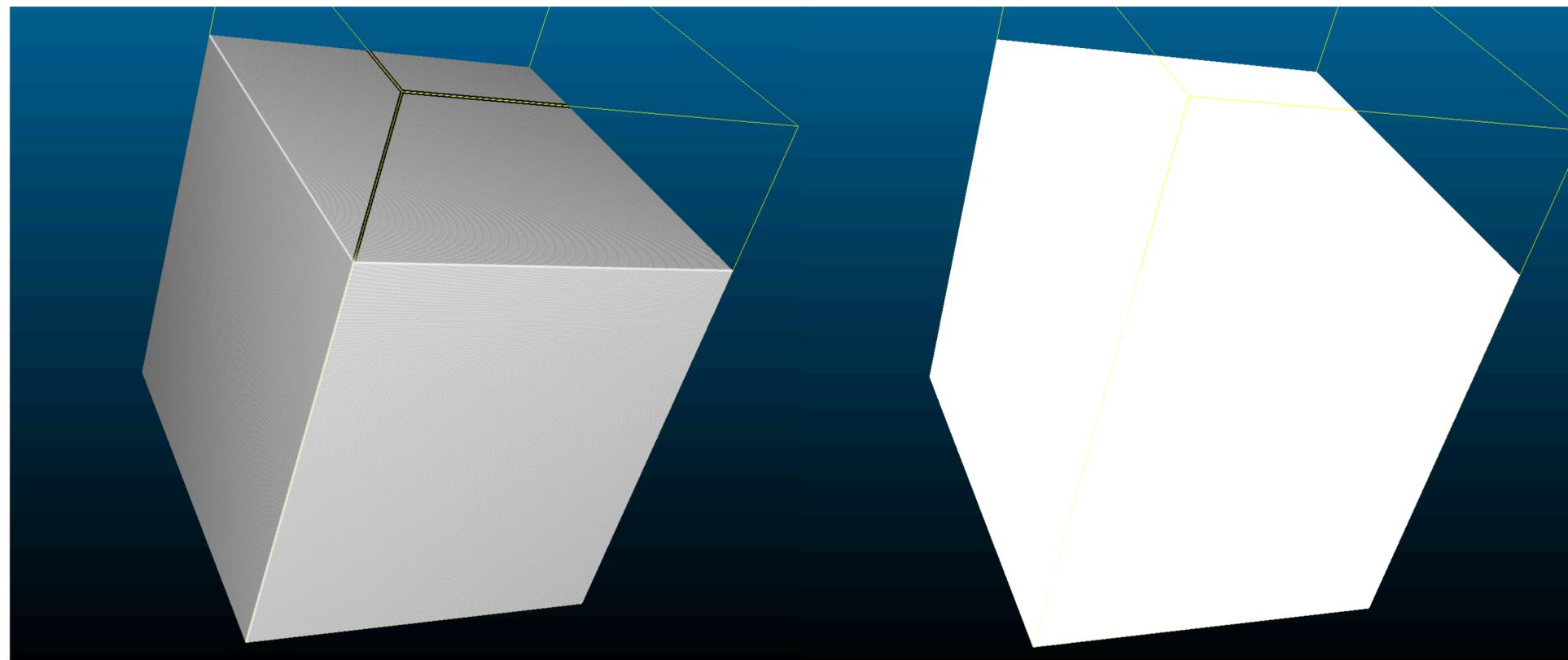
Point Cloud data with color info but without intensity/scaler (.las file)

lasImport	-691.25000000	345.00000000	0.00000214	73	118	51					
x	-691.25000000	y	345.00000000	z	0.00000214	color_R	73	color_G	118	color_B	51
lasImport	-690.25000000	345.00000000	0.00000214	37	81	18					
x	-690.25000000	y	345.00000000	z	0.00000214	color_R	37	color_G	81	color_B	18
lasImport	-689.25000000	345.00000000	0.00000214	139	179	116					
x	-689.25000000	y	345.00000000	z	0.00000214	color_R	139	color_G	179	color_B	116
lasImport	-688.25000000	345.00000000	0.00000214	129	170	102					
x	-688.25000000	y	345.00000000	z	0.00000214	color_R	129	color_G	170	color_B	102
lasImport	-687.25000000	345.00000000	0.00000214	98	139	71					
x	-687.25000000	y	345.00000000	z	0.00000214	color_R	98	color_G	139	color_B	71
lasImport	-686.25000000	345.00000000	0.00000214	61	101	39					
x	-686.25000000	y	345.00000000	z	0.00000214	color_R	61	color_G	101	color_B	39
lasImport	-685.25000000	345.00000000	0.00000214	84	125	57					
x	-685.25000000	y	345.00000000	z	0.00000214	color_R	84	color_G	125	color_B	57



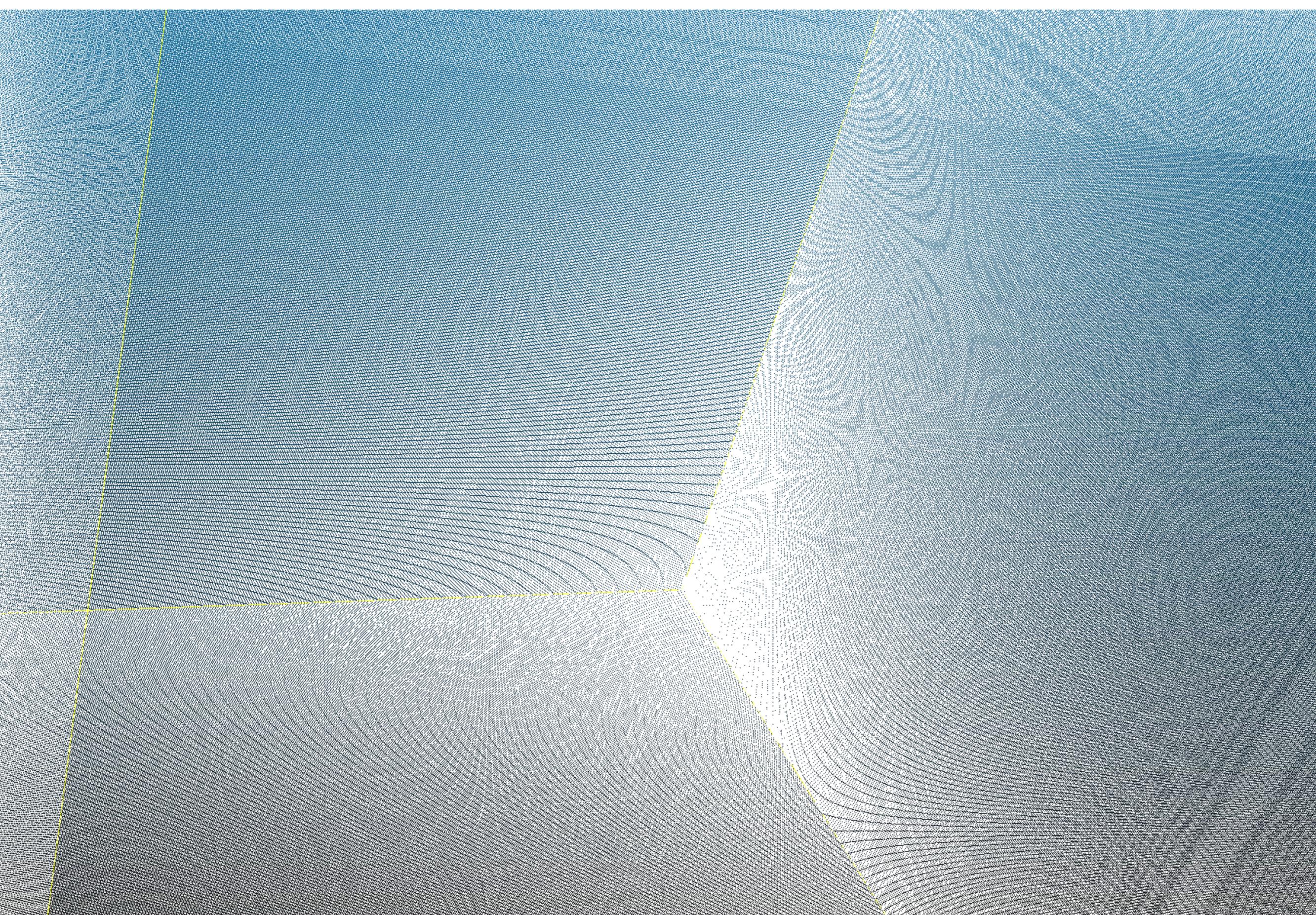
data with rgb

data with rgb and shading

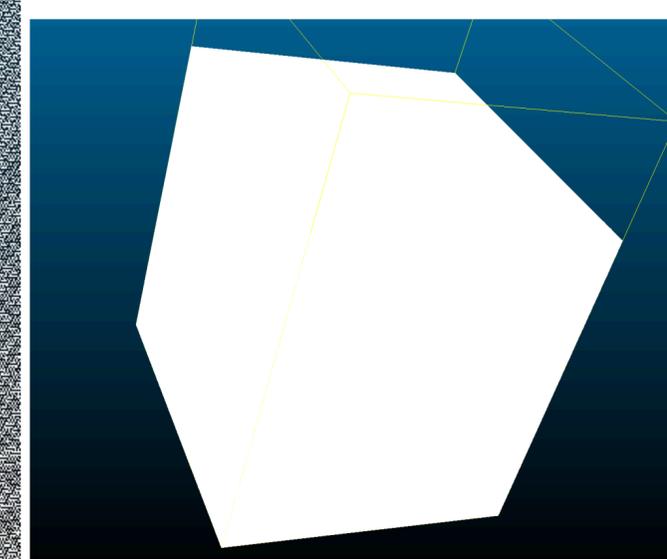


data without rgb
but with shading

data without rgb
nor shading



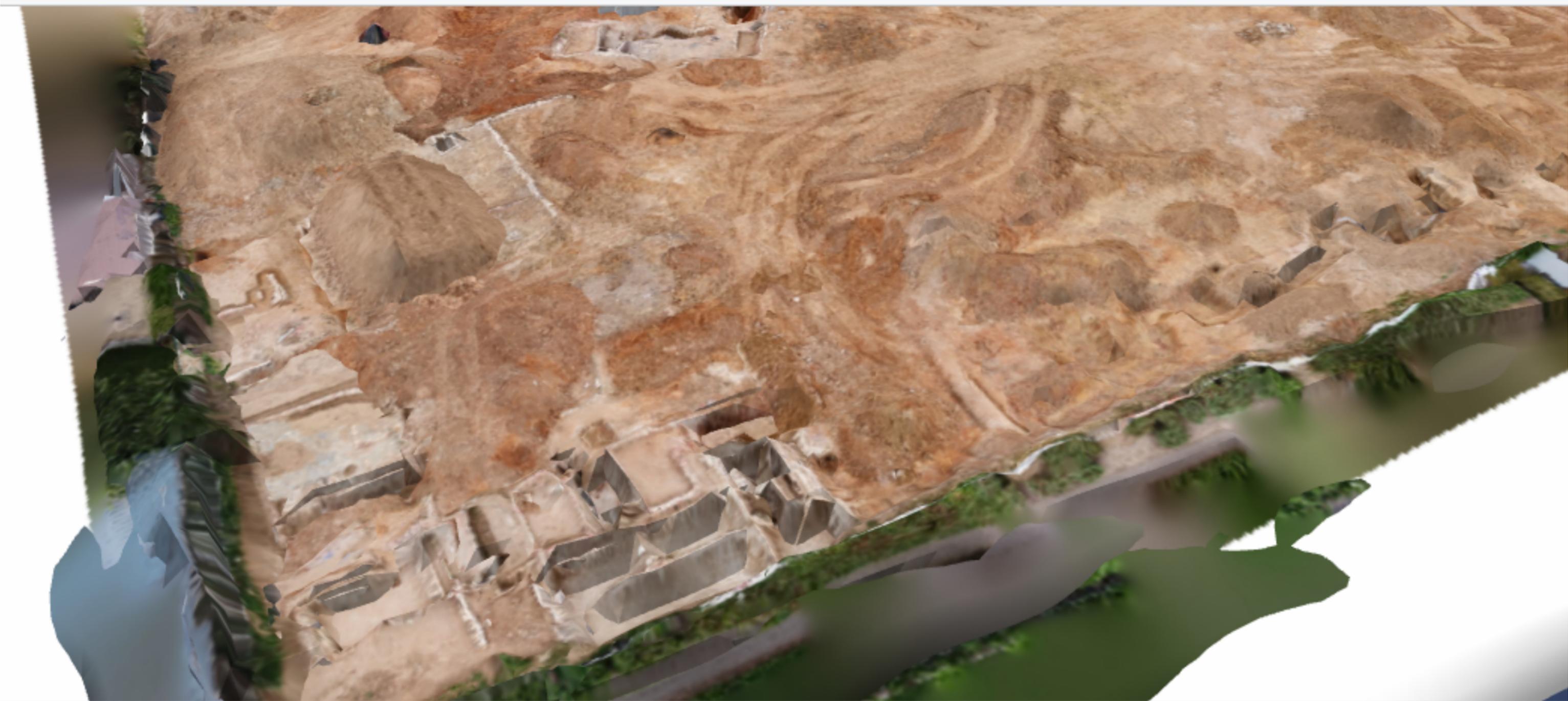
Closeup view
of data
without rgb
nor shading



**current UC-win/Road view of
point cloud**

Load data Measure

Look at the empty space for all the options we can implement



The only way you can manipulate the color is to reprocess each point cloud and save it out manually. And reimport into UC-win/Road. Not only time-consuming but also error-prone.

It will be useful to highlight the area of interest in the point cloud by changing the existing or adding new color to the data set.

This can be done via selecting the plane(s) in XYZ or boosting the existing color set to a more prominent color. Just like we are using a highlighter when reading a report.

Feature Set

- RGB and Intensity toggle
- Point cloud XYZ plane selection with distance option, either all the same color or color fades based on the point cloud's distance.
- Point cloud selection, like Photoshop's Lasso tool
- RGB slider or RGB color picker
- Maybe similar to new customizable shaders option but applies to Point Cloud

**view of point cloud using
new feature set inside UC-win/Road**

Load data Measure DWG Convert Options 7.0 Lighting Edge Position Map View Sprite Edit Sprite Ignore Depth

Sampling Scale Factor 3.500
Discard Threshold 0.070

Point Cloud



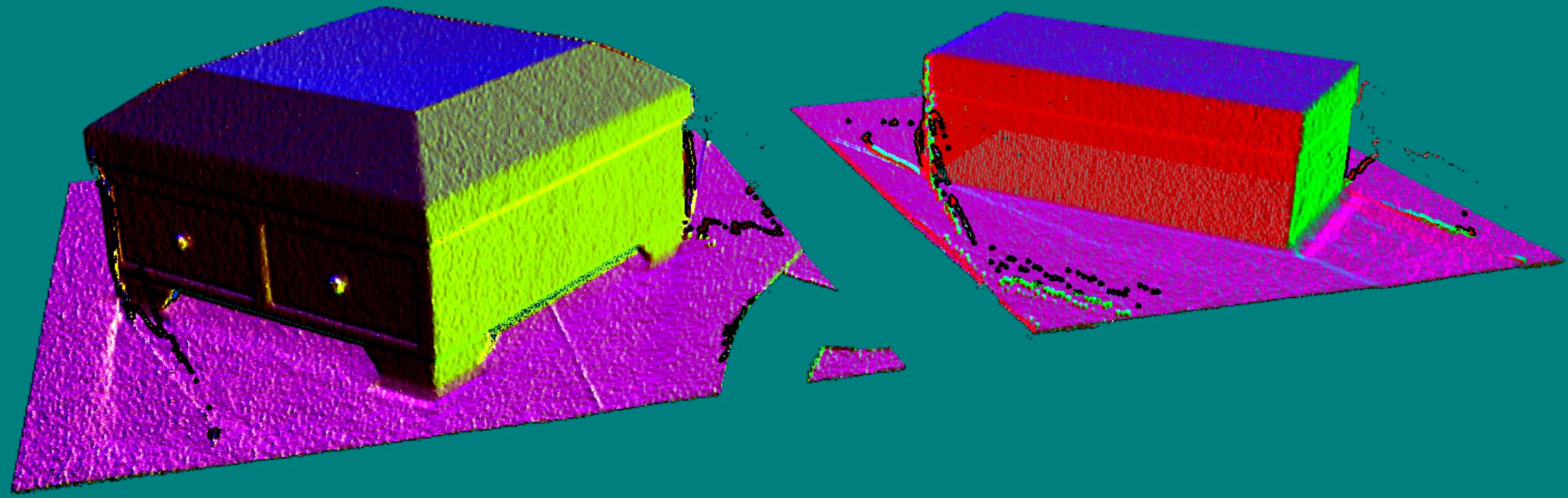
Imported point cloud data

File Home Edit Views Record / Play Analysis Point Cloud Server Debug

Load data Measure DWG Convert Options Lighting Edge Position Map View Sprite Edit Sprite Ignore Depth

Sampling Scale Factor 1.500
Discard Threshold 0.070

Point Cloud



colorized normal

File Home Edit Views Record / Play Analysis Point Cloud Server Debug

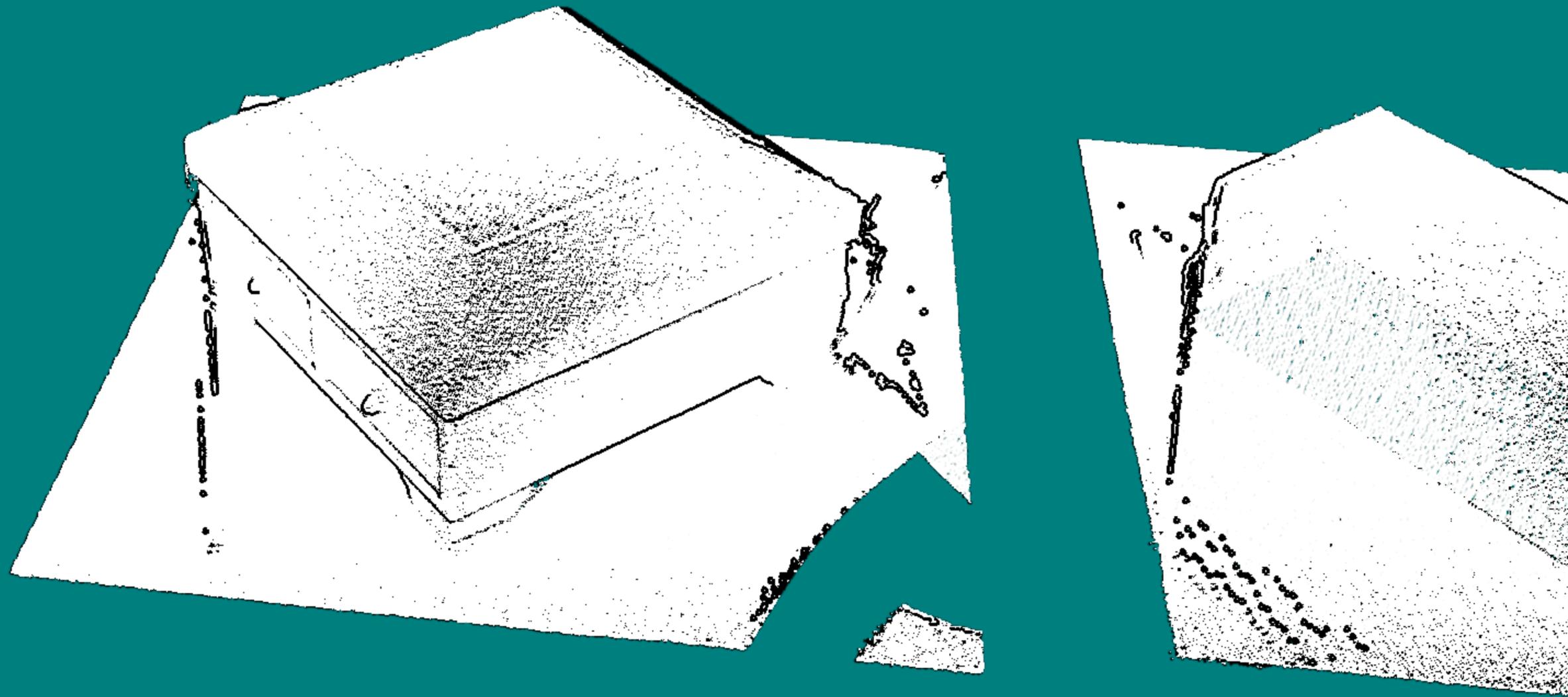
Load data Measure DWG Convert Options 3.1 Lighting

Edge Position Map View Sprite Edit Sprite Ignore Depth

Sampling Scale Factor 1.500

Discard Threshold 0.070

Point Cloud



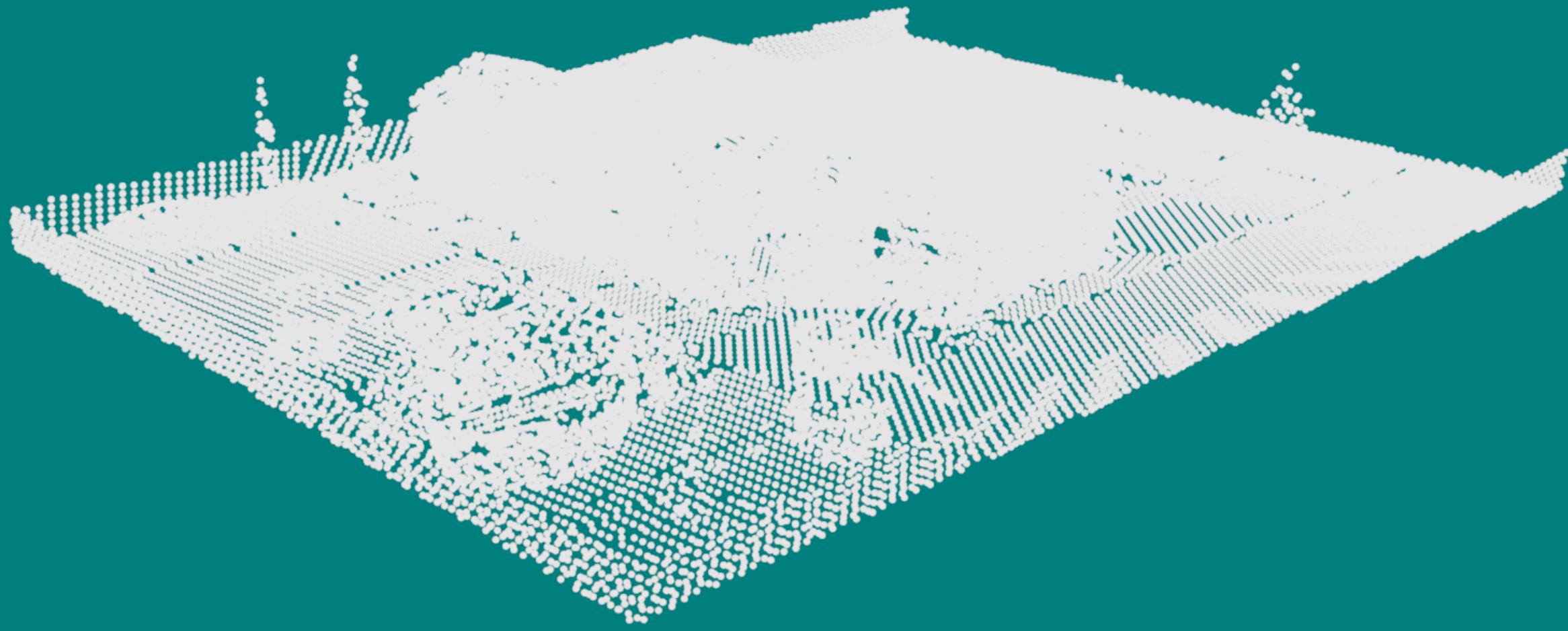
edge detection

File Home Edit Views Record / Play Analysis Point Cloud Server Debug

Load data Measure DWG Convert Options 7.0 Lighting Edge Position Map View Sprite Edit Sprite Ignore Depth

Sampling Scale Factor 3.500
Discard Threshold 0.070

Point Cloud



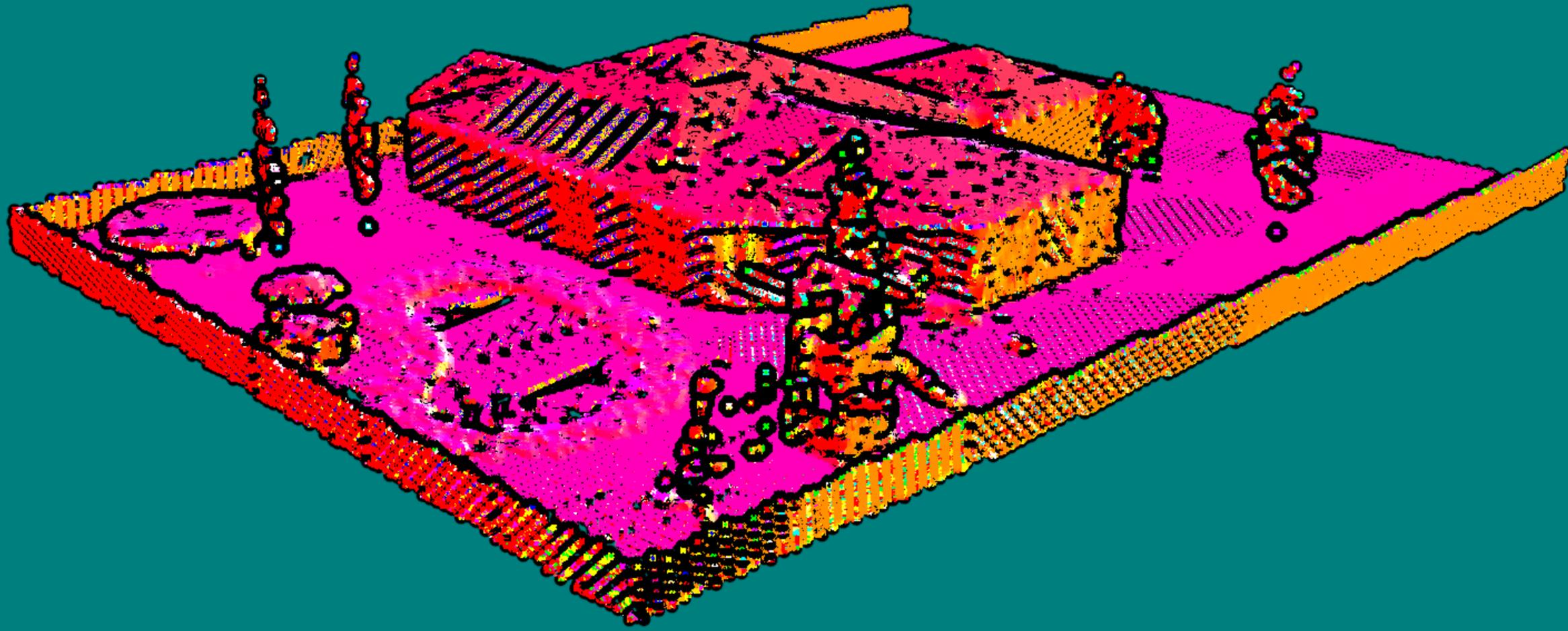
Imported point cloud data

File Home Edit Views Record / Play Analysis Point Cloud Server Debug

Load data Measure DWG Convert Options 13.0 Lighting Edge Position Map View Sprite Edit Sprite Ignore Depth

Sampling Scale Factor 3.500 Discard Threshold 0.070

Point Cloud



colorized normal

File Home Edit Views Record / Play Analysis Point Cloud Server Debug

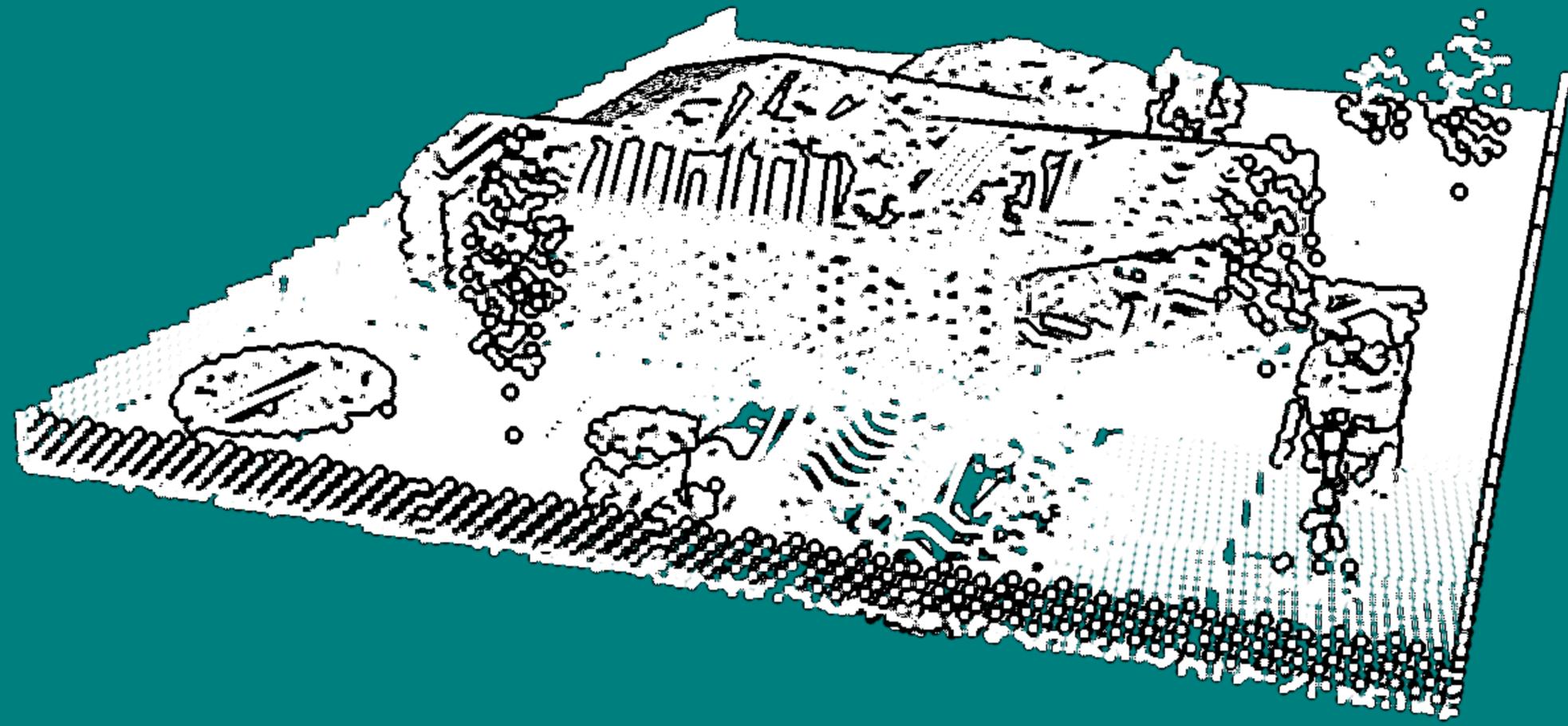
Load data Measure DWG Convert Options Lighting

Edge Position Map View Sprite Edit Sprite Ignore Depth

Sampling Scale Factor 2.000

Discard Threshold 0.070

Point Cloud



edge detection

Projected Goal

Gradually building up the point cloud data size and complexity of the visual structure to use the new feature set.

Working with Forum8 to implement the point cloud selection tools and changing the existing colors in the point cloud.

Creating or utilizing the existing point cloud to data to test the robustness pithing the UC-win/Road (no crash!)