3D Scanning Ruckus Parts

3D Scanner Final Project

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12/13/2019

Contents

Problem Statement

Use the CREAFORM 3D scanner and CATIA V5 modeling software to generate different parts off a 2005 Honda Ruckus. A total of 5 parts where scanned. The seat, floor panel cover, front fender, as well as the front and rear battery plastics we modeled in this project.

Assumptions

Scans where taken to achieve the highest accuracy mesh possible so additional Generative Shape design was minimum. All parts where cleaned as best as possible before scanning.

Set Up

Scanner

It was found that the Go!SCAN 50 scanner (Figure 1) has a much higher accuracy reading then the Go!SCAN 20 scanner (Figure 2).

Figure 1. Scanner Go!SCAN 50

Figure 2. Scanner Go!SCAN 20

Positioning Targets

Two different sized infrared positioning targets as well as triangular plastic position targets where use. It was found that the Scanner Go!SCAN 50 cant pick up the smaller infrared targets.

Figure 3. For Go!SCAN 50

Figure 4. For Go!SCAN 20

Figure 5. Plastic Positioning Target

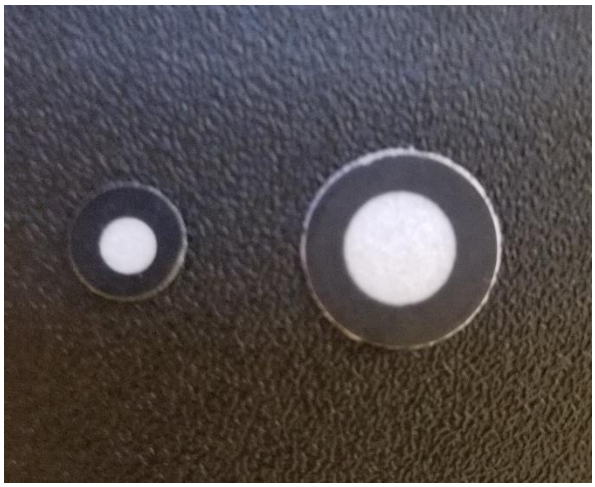

Figure 6. Size Comparison

Program

CREAFORM's VXelements was used in correlation with the Go!SCAN 50 to generate the physical model into a computer model.

Figure 7. VXelements start up

Scanning

Figure 8. Back battery plastic

The more reflective parts needed additional infrared positioning targets compared to the opaquer parts.

Figure 9. Battery housing with infrared positioning stickers and plastic positioning targets placed around it.

It was found that shooting in a dark room resulted in a more accurate scan. When placing the infrared positioning stickers, note that more isn't always better but depends on the parts color and reflectivity. Too many stickers result in a lot of rebuilding to do in CATIA. Placing the stickers to close to a objects edge will also result in poor scan quality and surface rebuilding in CATIA.

Figure 10. Scanner at the correct distance away from the floor panel.

Scan of Seat- Physical Model to Completed Render

Figure 11. Physical Seat

Figure 12. Infrared Targets Added

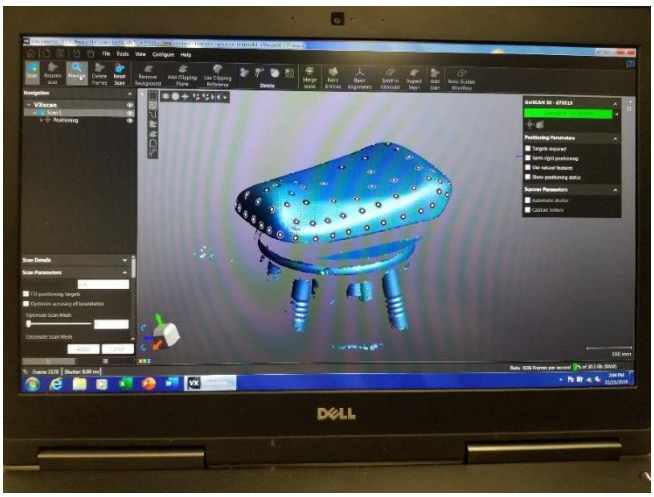

Figure 13. Scanned Seat in VXelements

Figure 14. Imported mesh.

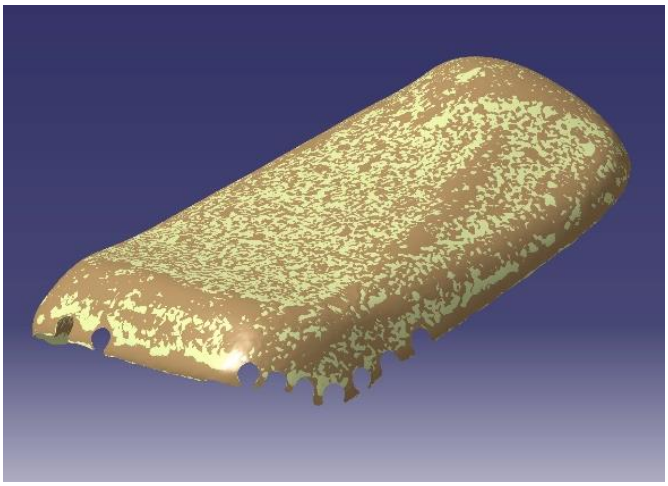

Figure 15. Automatic Surface and mesh.

Figure 16. Finished seat.

Front Fender

Figure 17. Fender and Infrared Targets

To many infrared targets where placed to close to the fenders edges and created a bad mesh

Use the “CLEAR BACKGROUND” tool to delete unwanted scanned items.

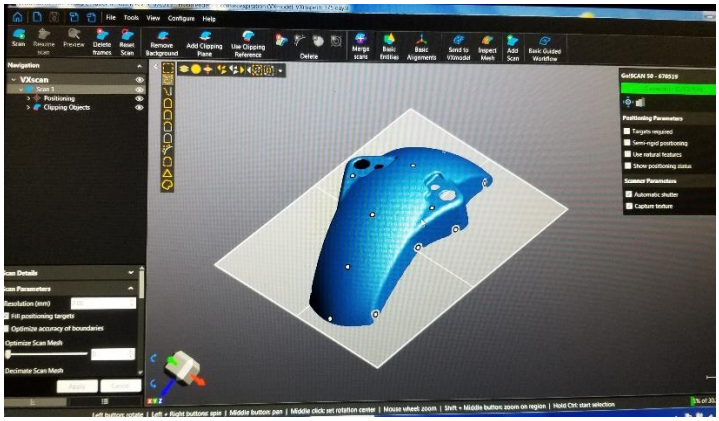

Figure 18. Fender right before export

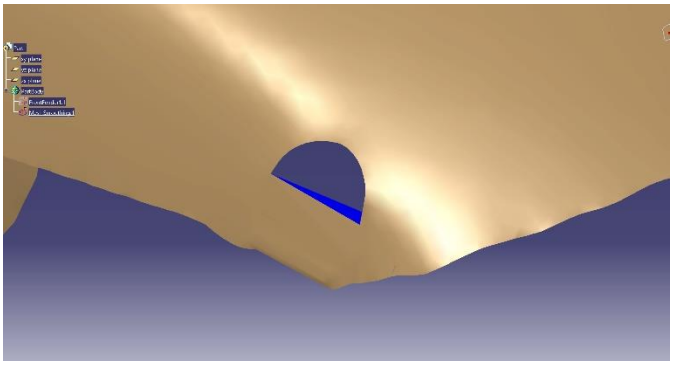

Figure 19. Filling unwanted hole

Using the Interactive Triangle Creator the holes where filled

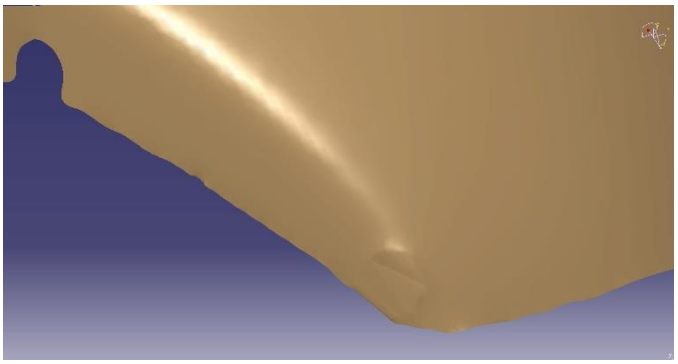

Figure 20. Filled Hole

Interactive Triangle Creator was found to be unsuccessful and the holes where left open.

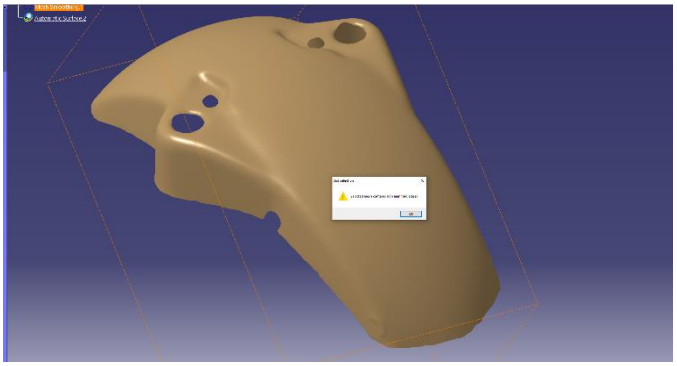

Figure 21. Error due to non-matching vertices'

Figure 22. Finished Fender

Automatic Surface Tool

Prep

When preparing the imported mesh for the automatic surface tool multiple things need to be addressed. The scanner may pick up extra surfaces when scanning, such as the surface it is resting on or the lazy Susan its placed on to rotate around easier. Some of the points in the mesh cloud that are imported do not connect with the main body (Figure 23) and are just extra pieces and can be deleted. All the points that are not connected to the main body prevent CATIA V5 from creating an automatic surface. Once all disconnected points are deleted an automatic surface can be created. Note that if the settings for mean surface deviation and surface detail in the automatic surface tool (Figure 26) are out of range the surface created will be abstract and not the desired surface.

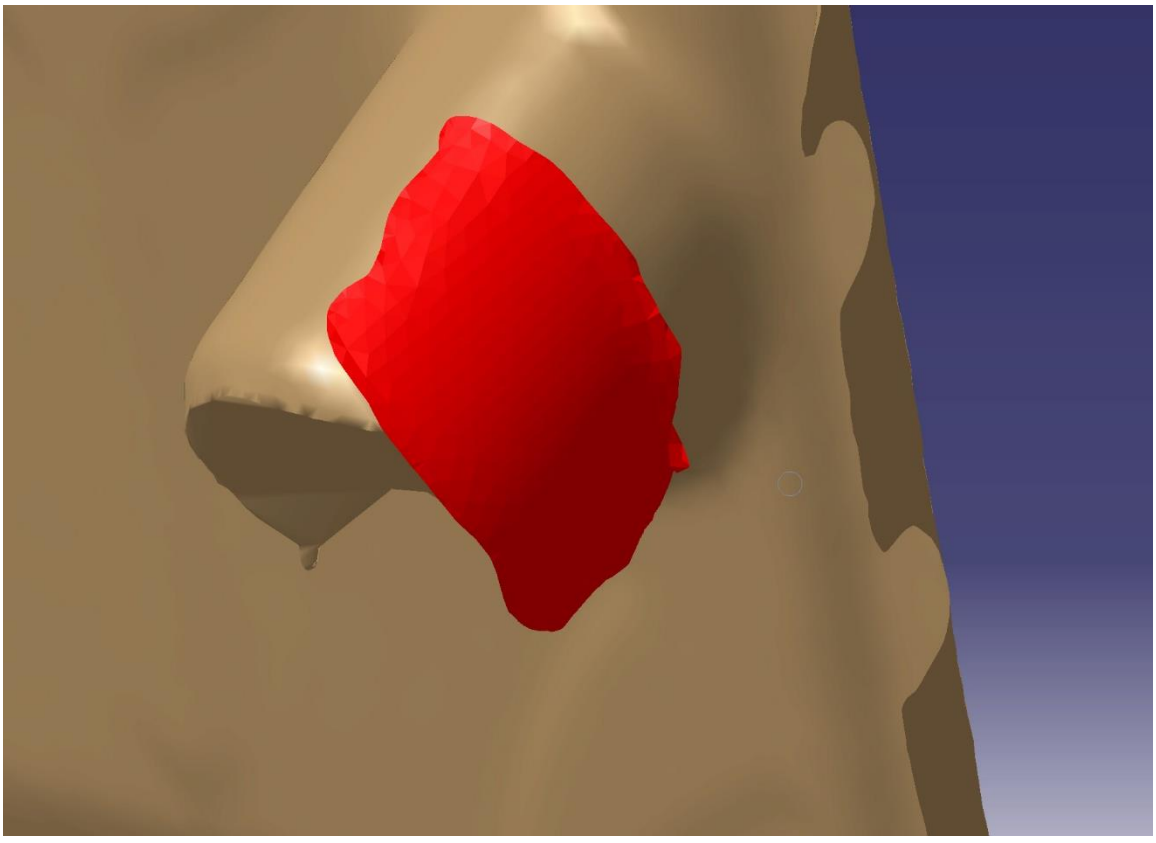

Figure 23. Example of added points that are not connected to the main mesh cloud and are able to be deleted without compromising the end product.

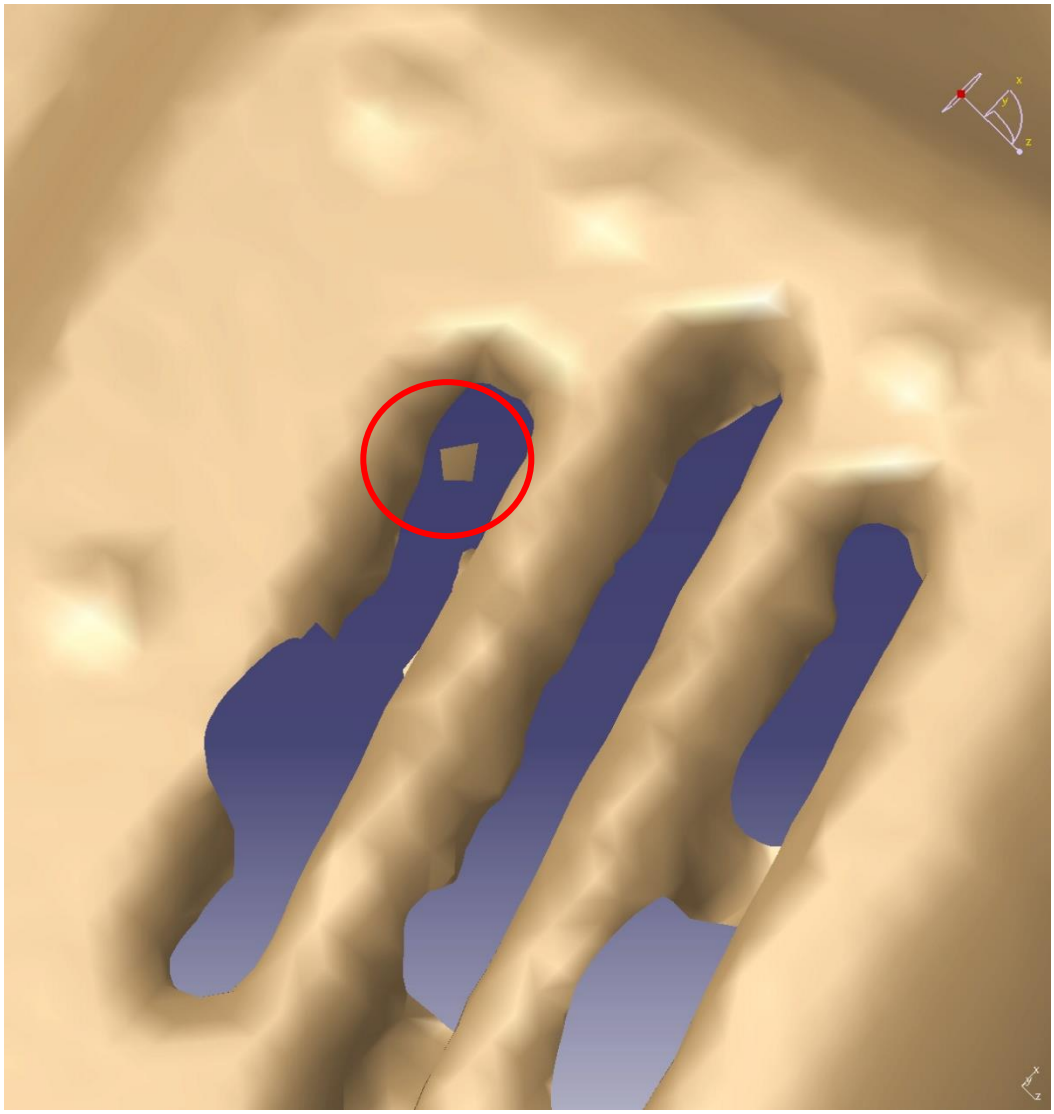

Figure 24. Example of added point clouds that are disconnected from the main mesh body.

Some points may be extremely hard to see and require a large amount of time to locate.

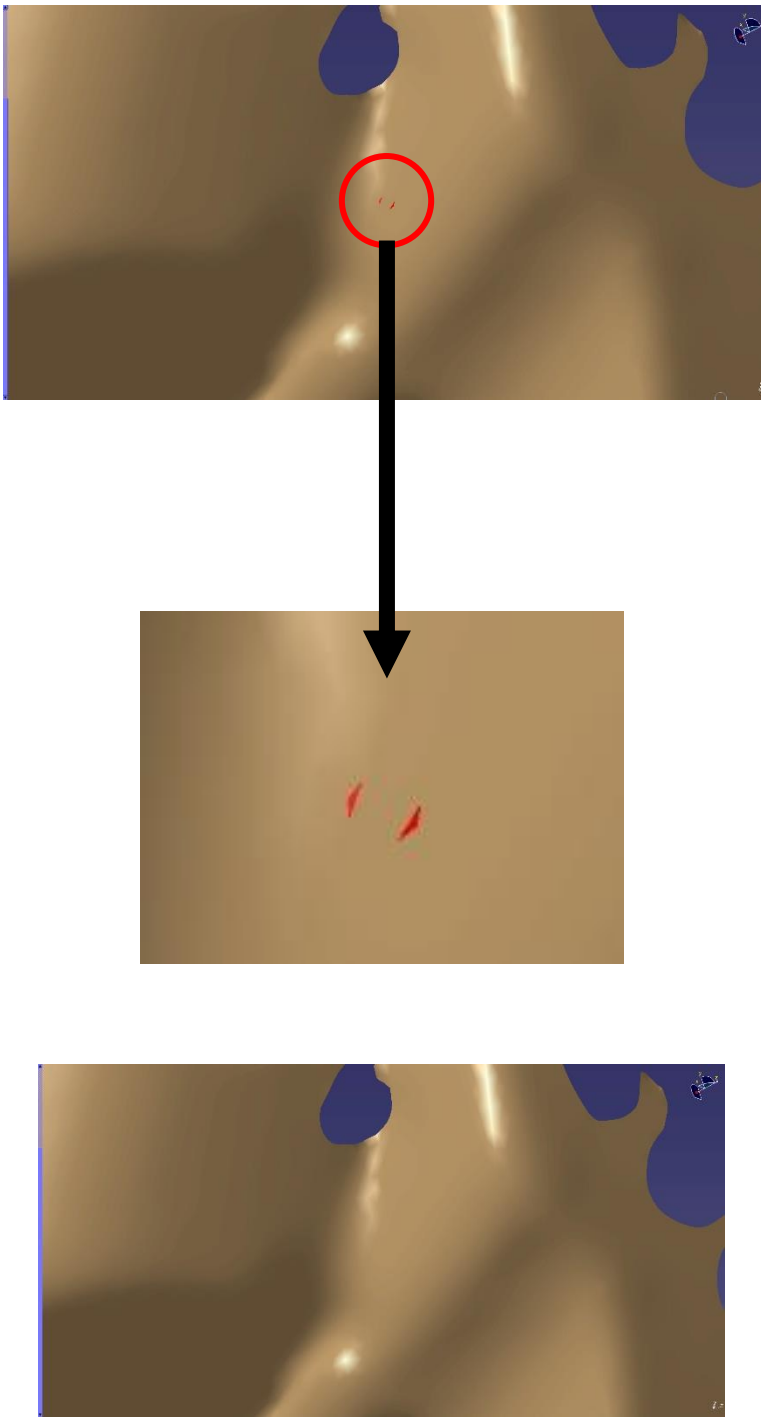

Figure 25. Example of extremely small added point cloud with a zoomed in photo and the end result after being deleted.

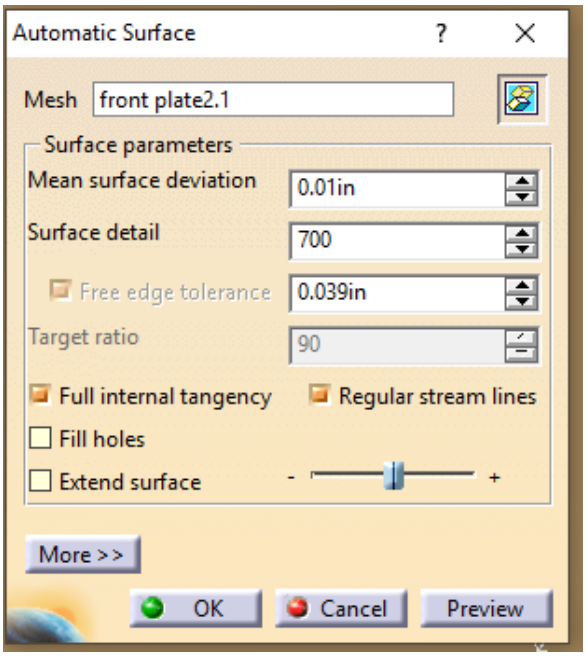

Figure 26. Automatic Surface Tool Window

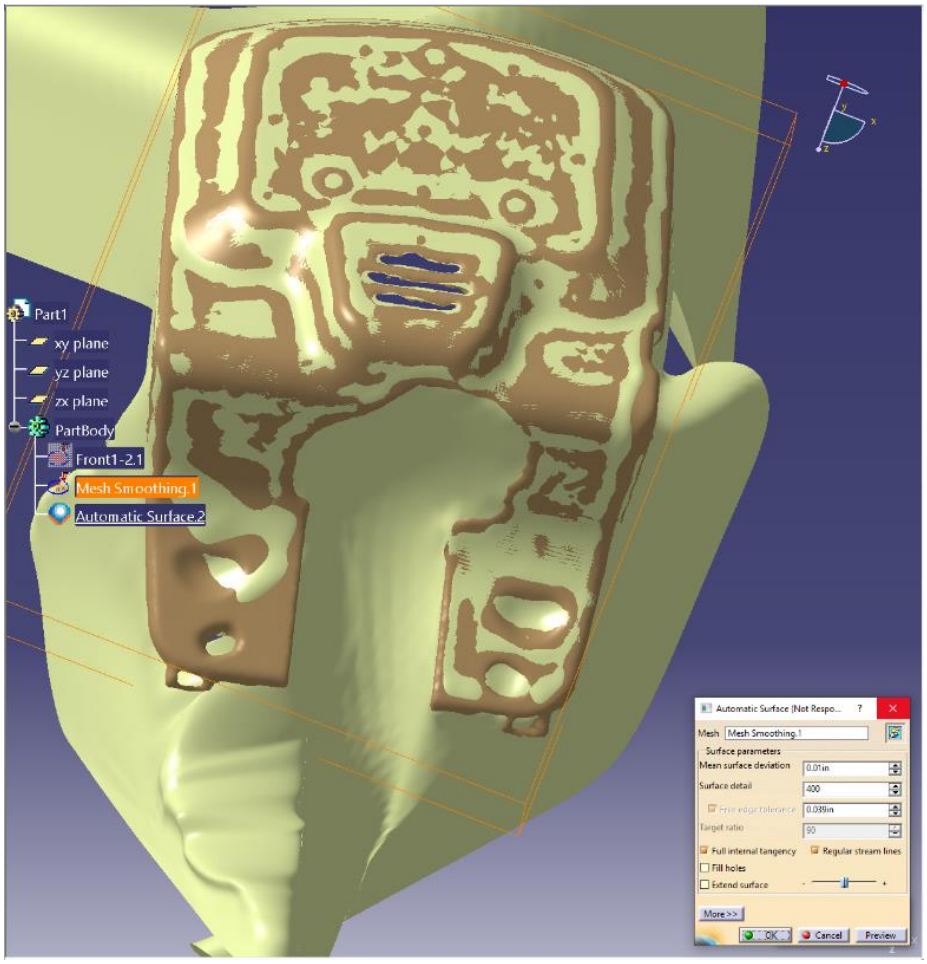

Figure 27. Example of when settings are out of range.

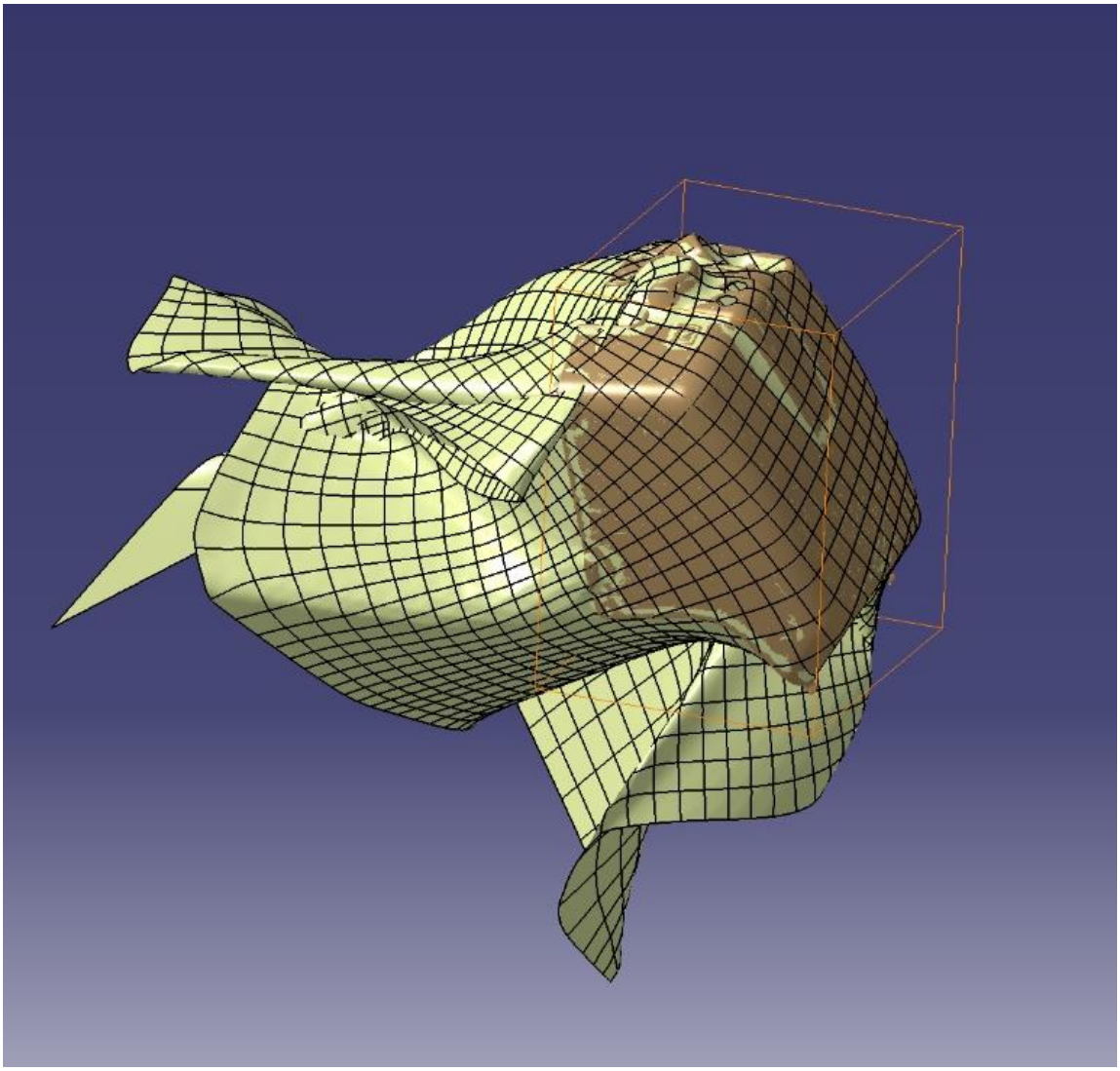

Figure 28. CATIA V5 Modern art from settings out or range.

Finished Products

Seat

Figure29.

Floor Panel Cover

Figure 30.

Front Fender

Figure 31.

Front Battery Plastics

Figure 32.

Rear Battery Plastics

Figure 33.

Conclusion

Due to limited access to the 3D Scanner, the holes in the finished product left by the infrared positioning targets where unable to be removed by rescanning the part with fewer targets. Opaque surfaces seemed to scan a lot easier when the lights where off and the room was dark. I also found out that you are able to delete the scanned surface the item is resting on in the VXelements program itself. This makes editing the mesh in CATIA V5 much easier. When it comes to very smooth shiny surfaces it was found that the larger infrared targets left small bumps wherever they were placed, but the smaller ones did not.