



ARMA AUTOMOTIVE INC.

Kit Car Body Work

Project: Automotive Body Panel Surfacing – Polish and Style Suggestions Needed

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Overview:

We are designing a kit car and have created a 3D model of the body panels using custom software. The design is mostly complete, but I need an experienced surface modeller to refine the form and ensure clean, production-ready geometry. The current design can be exported in .OBJ format (or others upon request).

The current issues revolve around surface ripples in areas and the continuity or smoothness between surfaces that meet together when panels sit side by side. The surface ripples present under certain lighting from particular directions. The continuity will present when viewing two panels side by side, edge to edge, as viewed from the side. The profile of the body panels should smoothly flow between the panels.

Finally any design ideas for changes to the body are welcome as the moulds have not started manufacturing however we are running short on time and it would be nice to refine as best we can to release this version one product.

We used a custom 3D modelling program to create the current models however our tools lack some features that make the fine detail finishes easy and we also need to increase the speed so that we can start creating the moulds.

The design plan was to use an approximating spline mesh for most of the surfaces which would allow us to define high detail along the edges where the fitment between panels is precise and have fewer points of detail in the main surface area. This way we could alter the shape and flow contours easily by moving a few points without having to smooth out surfaces as much. The issue is that I am not sure how to best structure the project to work with other designers using other tools and of which specific modelling tool and structure would be best. I can export a contoured high detail mesh generated by the spline interpolation but this may be hard to work with, or I could export the un-interpolated mesh with just the points but it will not look at all like the desired surface shape.

It is desirable for us to be able to share the current model design and have refinement work done to improve the surface and edge continuity in a way that can allow for slight refinement later on and then re import the updated design model back into our software to generate the CNC routing tool paths for mould making.

In the past we manufactured a foam buck from models with slight issues in the 3D model and fixed them using body filler and sanding before making moulds. We can do this to some degree but it is risky and time consuming as only slight changes can be made and it also introduces variances which may introduce continuity issues. In other words post machining work can attempt to fix smoothness issues but it's more difficult to correct continuity issues because any changes to surfaces while fixing one viewing angle will also affect continuity from other angles which may be undesirable.

It would be good to get input on the strategy including tools and methods for modelling and maintenance of the models as a starting point. Ideas could include smoothing out the mesh surfaces bit by bit in areas with issues to resolve the issues or we could look at remodelling some panels in another parametric tool like Rhino or Plasticity however I am not familiar with these.

Resources:

1) Web Preview

The current web model for the kit can be viewed online at:

<https://armaautomotive.com/3d/>

Changes to the complete kit including body panels, chassis structure, mechanical, interior, etc. are updated here frequently. This is our resource for reviewing changes and integration with multiple teams working on different parts of the vehicle.

2) OBJ Files

OBJ mesh files can be downloaded from the website at:

<https://armaautomotive.com/development/>

Download the model obj file:

Download Arma 11 Model for Wavefront OBJ.

https://armaautomotive.com/download/Arma_11_obj.zip

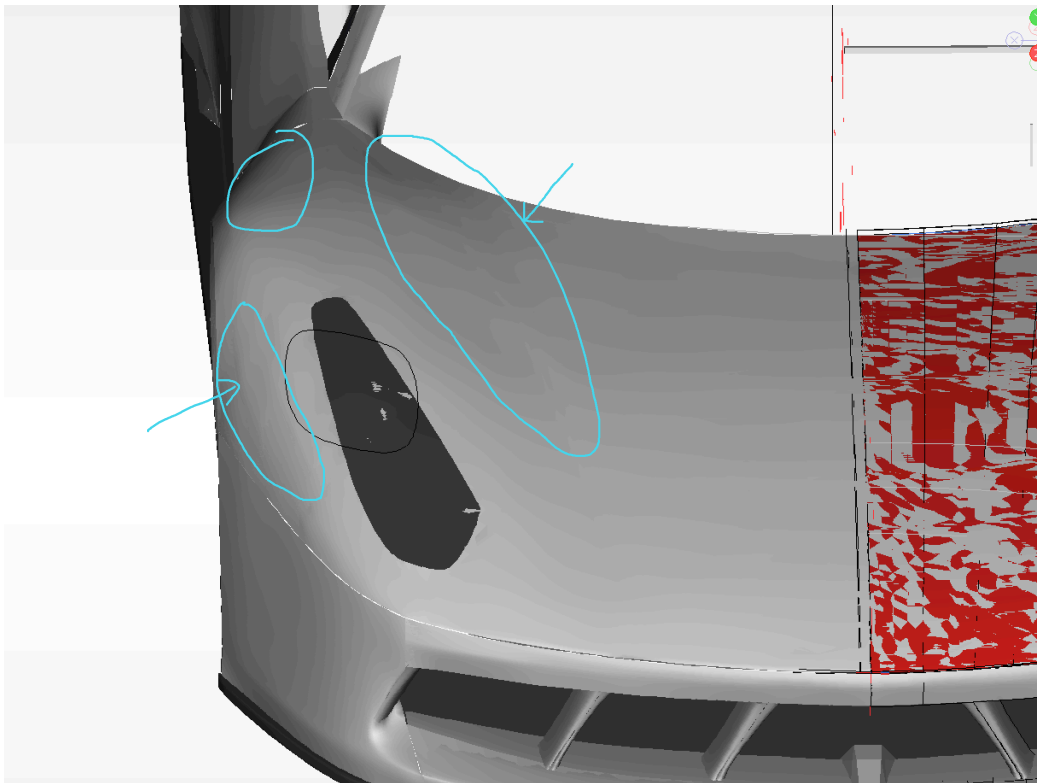
This file will contain the interpolated mesh files. This file does not currently include the curves that define many of the panel edges and style influences that guide the curvature. The lines are a work in progress and may be available soon.

I can also export the non interpolated mesh files if needed.

Smoothness:

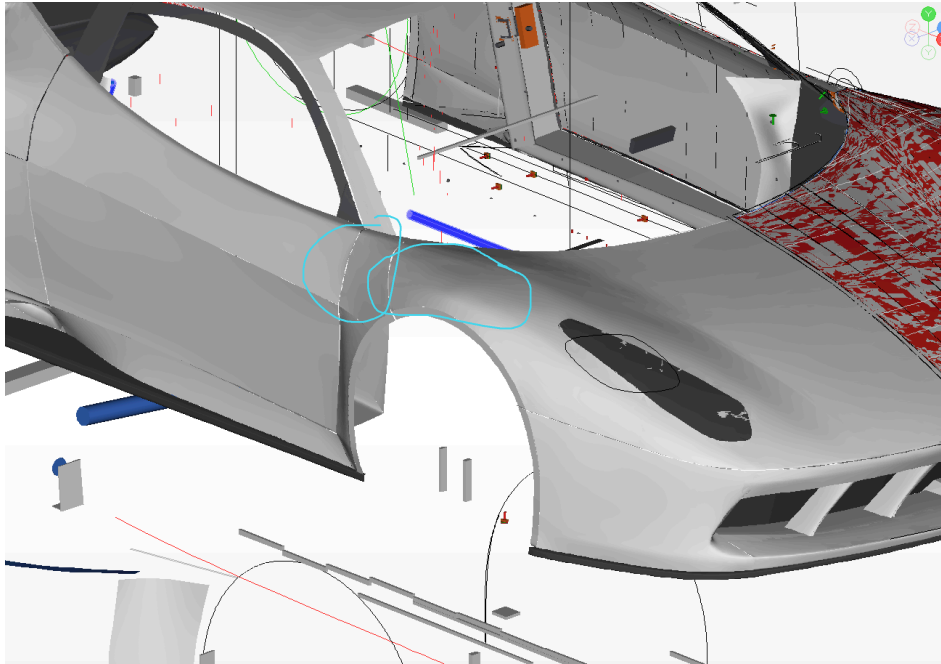
The first category of improvements include surface smoothness where there are either ripples or waves in some areas or discordant sections of curves that don't quite blend.

1) Front Hood



There is a slight valley between the wheel well and hood with ripples.

The side curve by the headlight also has ripples.



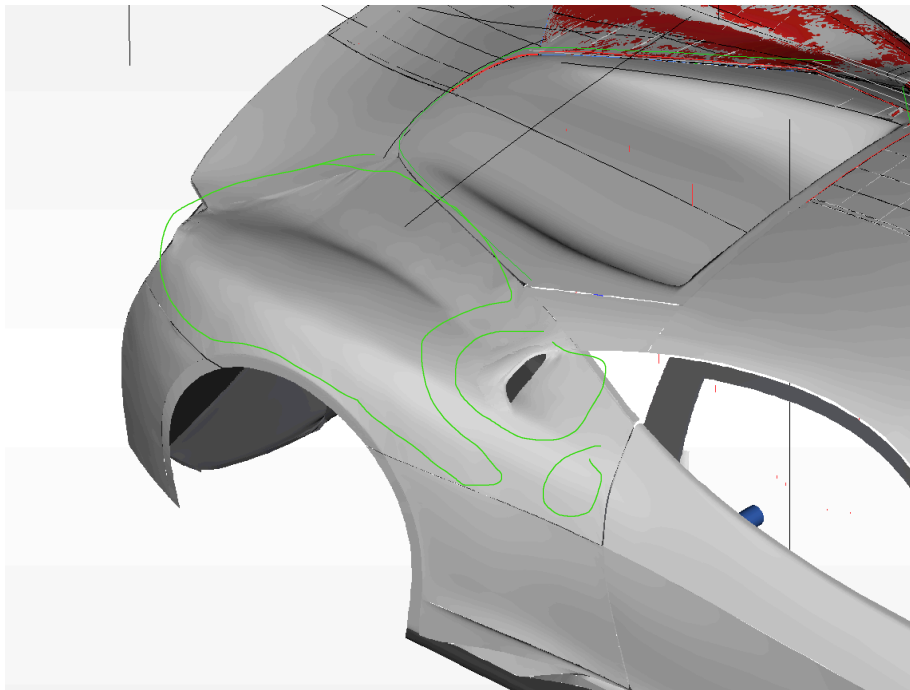
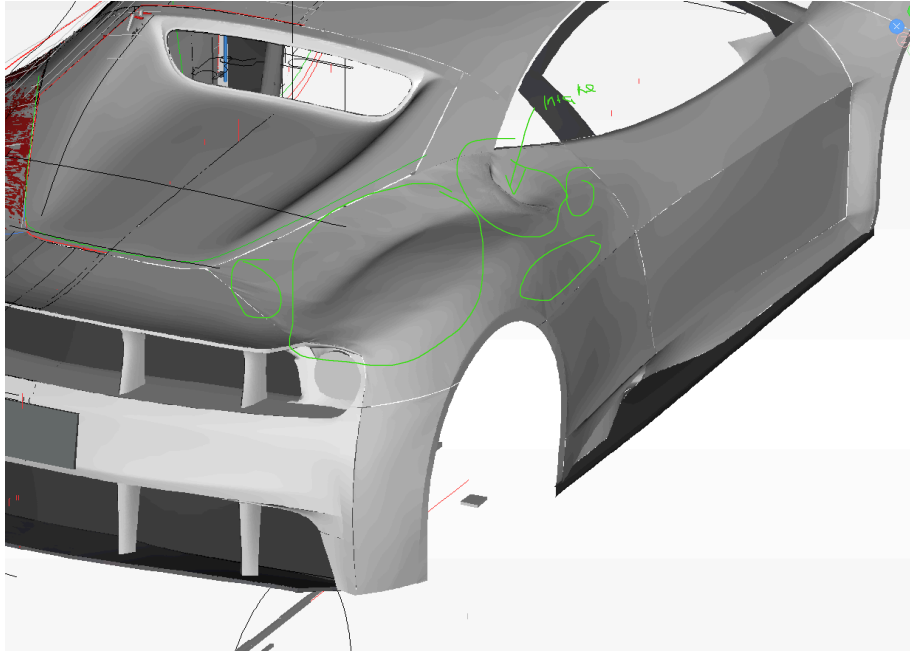
The rear section of the fender is ripply.

I would like to transition the hood panel with the fender side rim using a slight fillet curvature. Similar to the rear quarter. Will provide length and other details. The idea is to have a smooth transition without a sharp edge.

2) Rear Quarter Panel

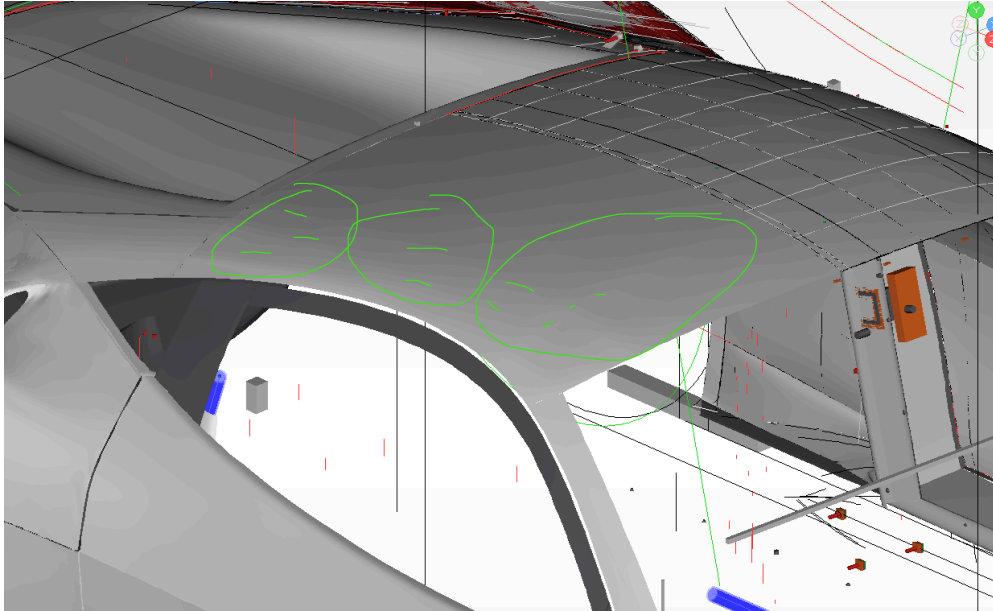
The rear quarter has the general outline that I like but the surface is very ripply. Also I would like a smooth transition to the air intake vent.

The transition to the wheel fender side rim should be a slight smooth fillet. Details to follow.



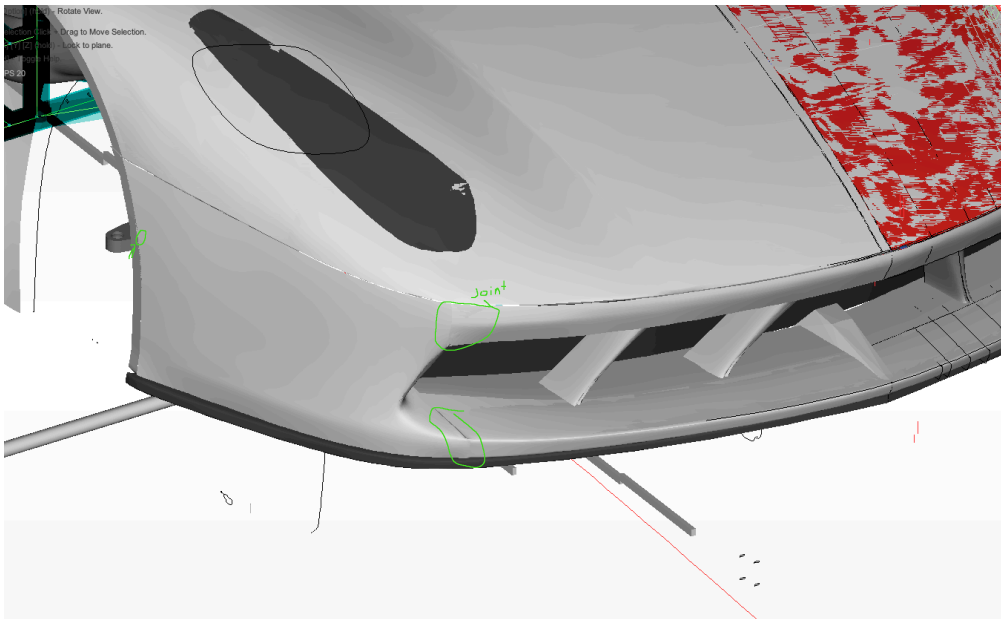
3) Roof Panel

The general profile of the roof is good but there are some ridges. Also the roof panel joins with two rear panels and the joint between them should be smooth.



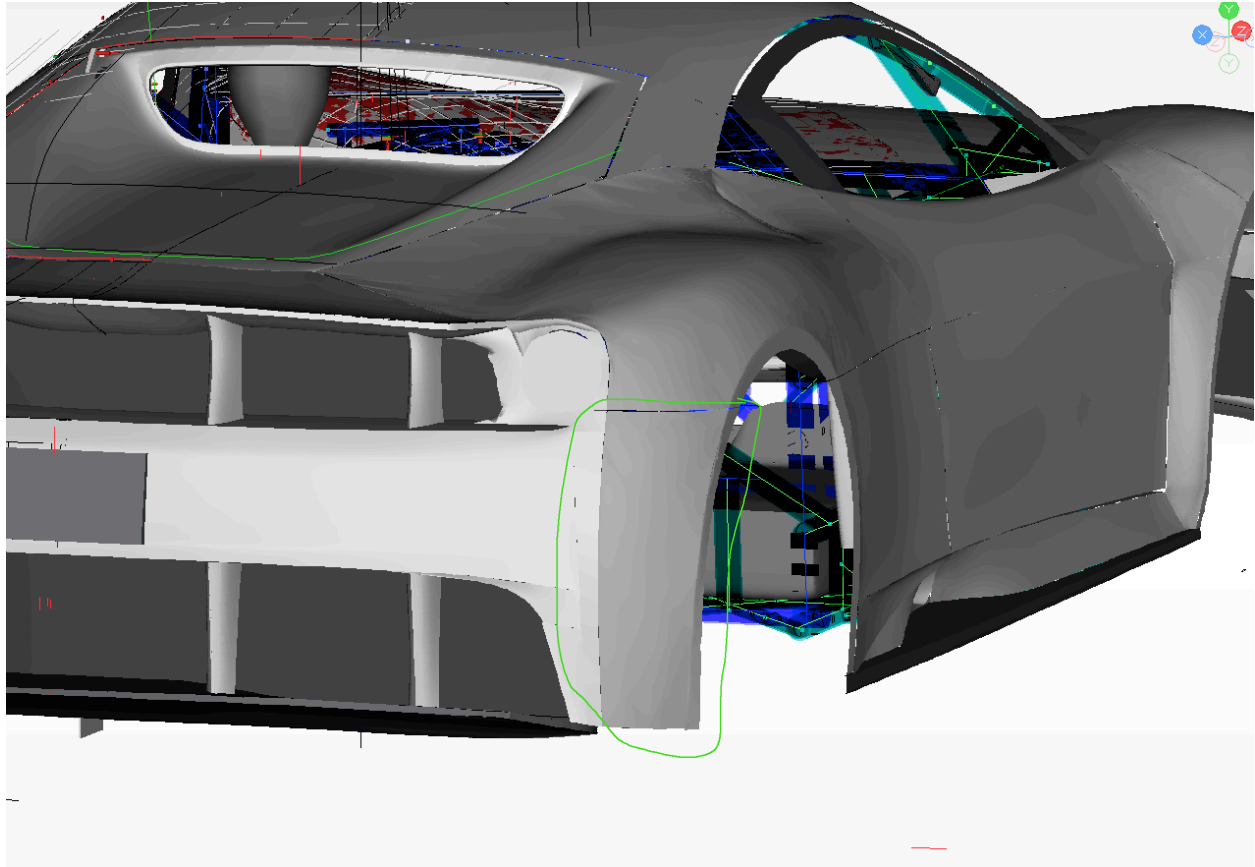
4) Front Bumper Side

The front bumper isn't too bad but there is a pretty ugly transition between the side and front panels.



5) Rear Bumper Side Panel

General shape is ok but there are slight inconsistencies in surface curvature. Would be great if the surface could be smooth and have a fillet transition to the side edge.



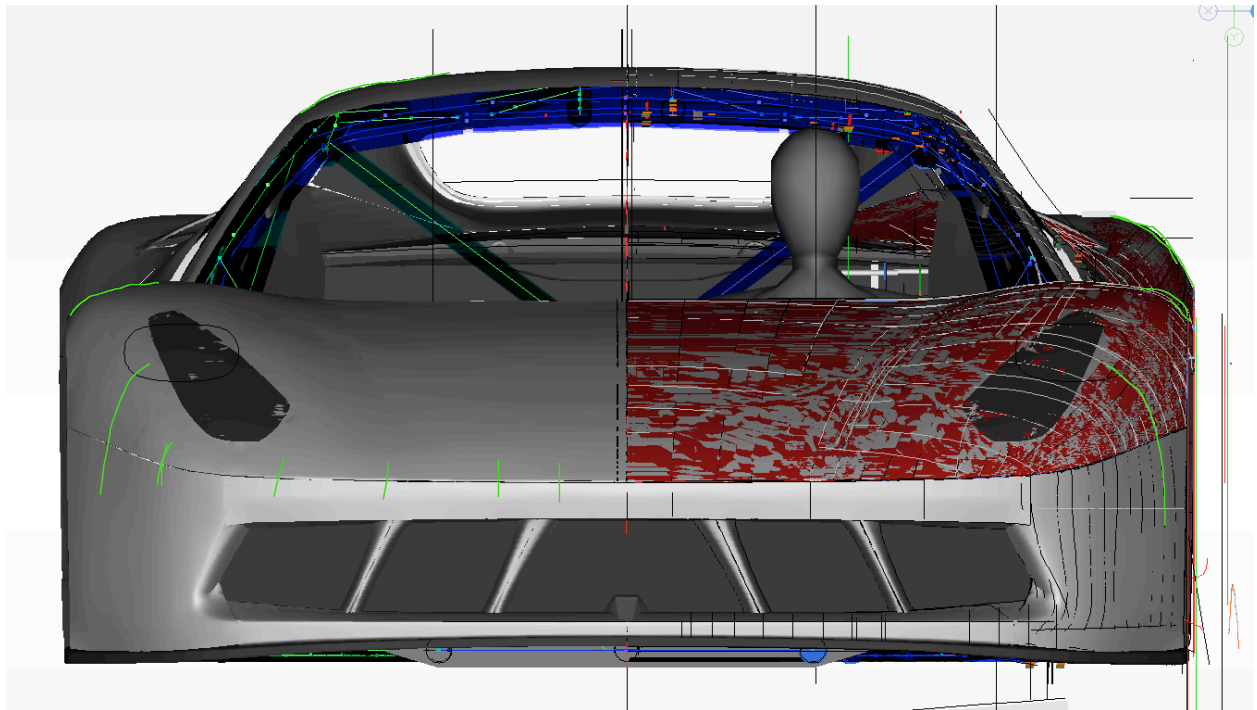
Note:

There may be other areas that need smoothing but these are the most significant.

Continuity

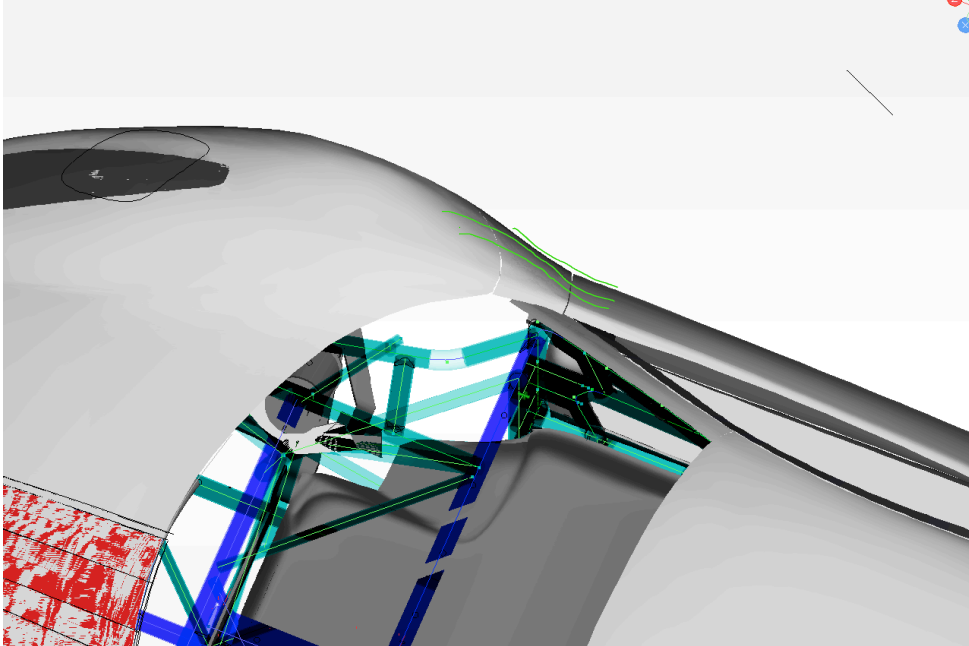
Continuity between surface curves and also between panels as they line up together is important for the overall quality of the finished vehicle. The following are areas to review for continuity when sculpting or modifying the mesh geometry.

- 1) Front hood transition to front bumper side. The front bumper side would probably be easier to move in order to conform to the curvature of the hood.



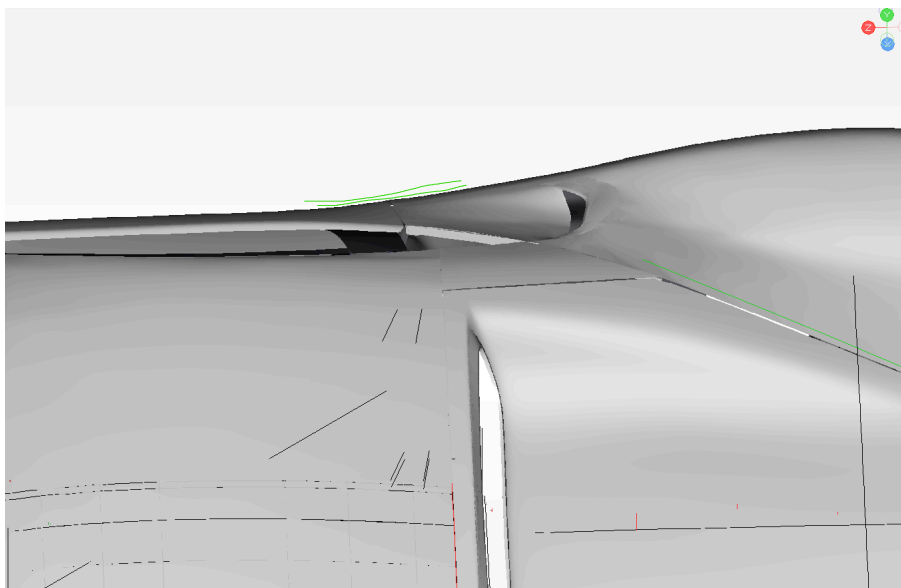
2) Front Hood - Side - Door transition

Check that the front hood, side and door as viewed from the top have a decent transition.



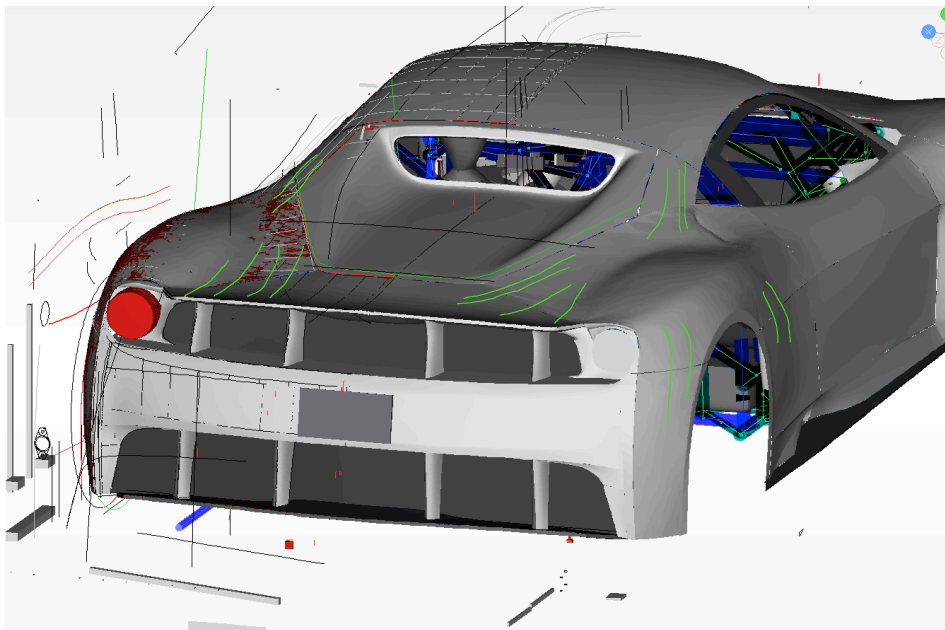
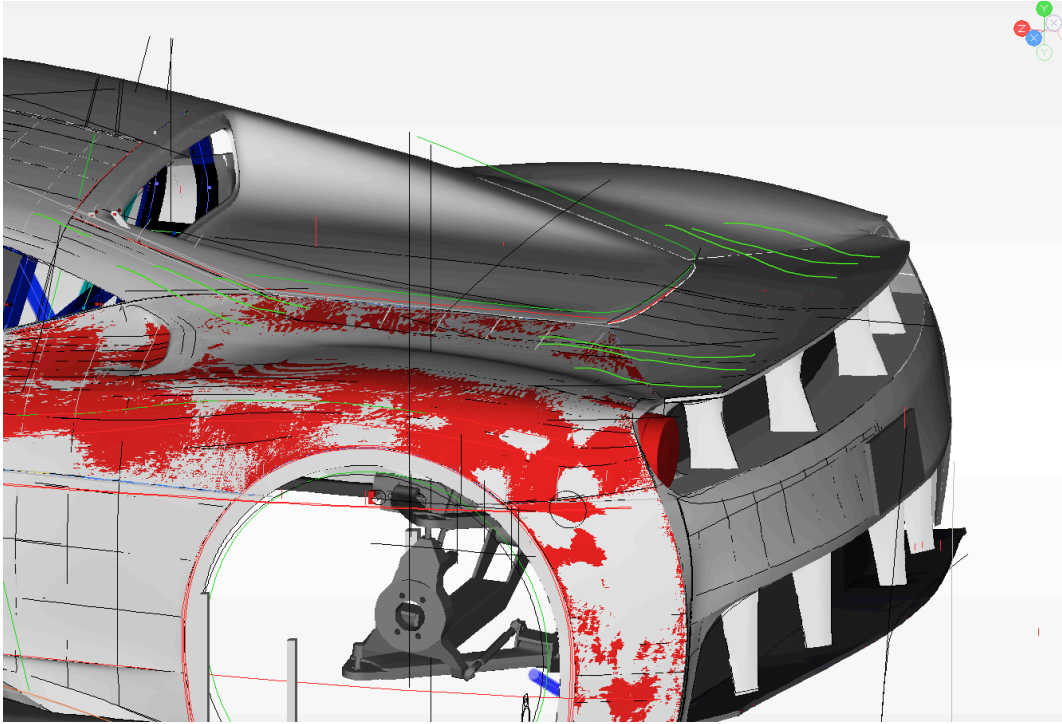
3) Door to Rear Quarter Transition

Check that the door to rear quarter transition is decent as viewed from the top.



4) Rear Quarter to Rear Spoiler Transition

5) Roof to Rear Quarter Transition.



Notes:

These are the most notable issues and areas of concern but there may be more areas to review later.

Some of the profile shape and panel edges come from curves in our program which currently aren't exported. They are illustrated here and I can look into exporting them if needed.

