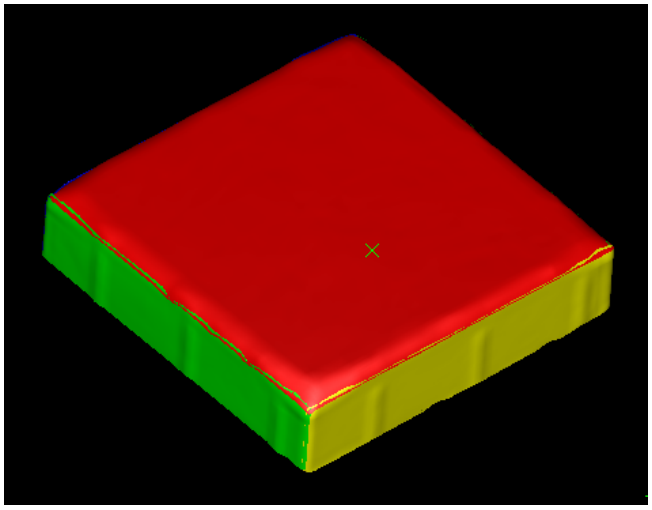
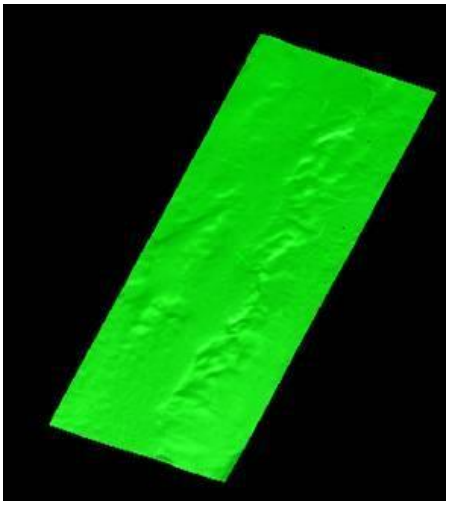
1. Finished **Fitting Surface to Point Cloud project**
   The fitting was implemented in two ways: 1) Fit the point cloud as one surface with some user interactions; or 2) Fit the point cloud with divided pieces and combine them to one body;

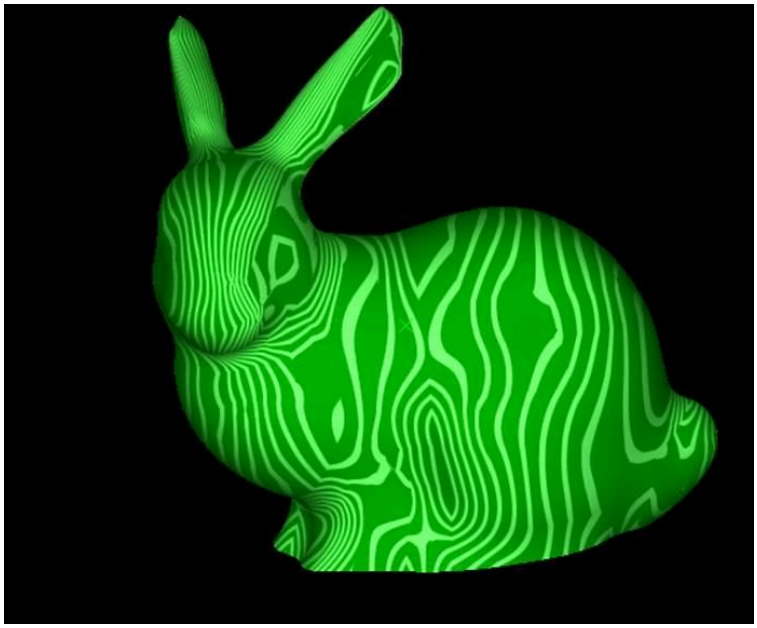
   Fit one surface



   Fit multiple pieces



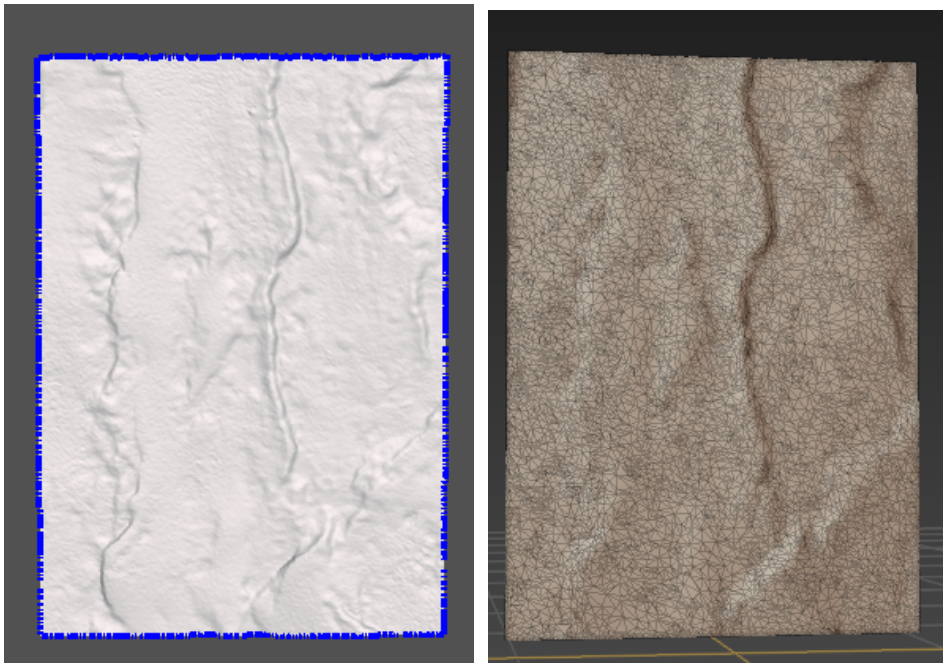
2. Completed **Patching Quad-mesh with Biquadratic and Bicubic Spline Surfaces**
   Basic workflow:
   1) Input quad-mesh (.obj);
   2) Pre-process the quad-mesh to valence-4 cells (quad-dominant, may have non-quad cells);
   3) Patch the quad-cells;
   4) Patch the extraordinary cells;
   Result patches are C1 continuous;



3. Finished **Mesh Simplification Project**

   Mesh reduction could be used in large size point cloud mesh fitting; this mesh simplification is max error controlled; we could specify a max error to control the mesh reduction;

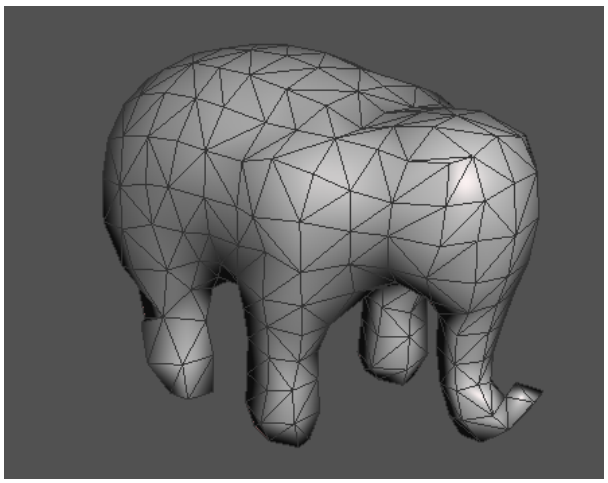
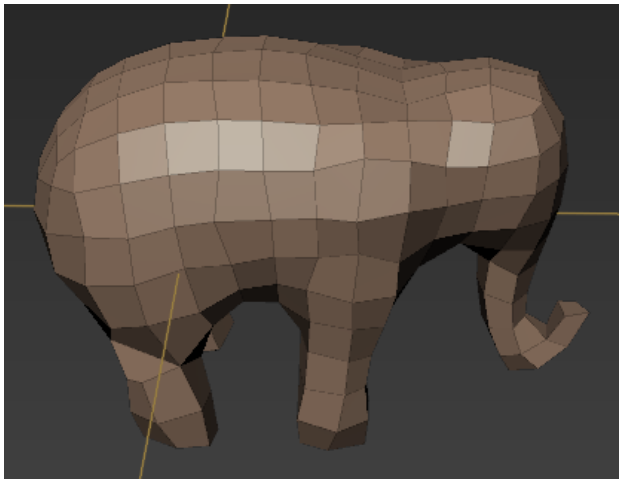
Point cloud part(417,847 triangles) 5% (20,515 triangles) -- 19.102772 seconds



4. Implemented **Converting Triangle mesh to Quad mesh**

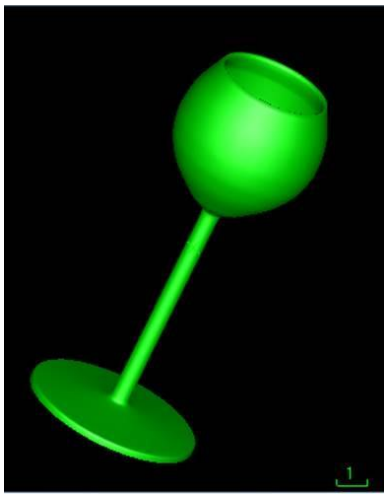
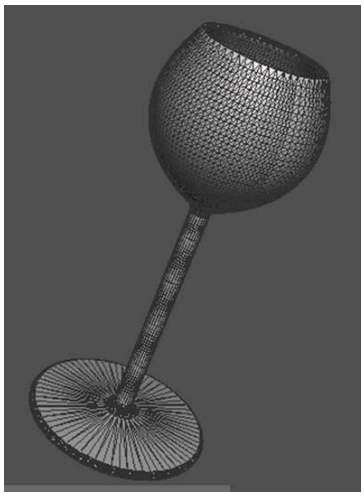
   Quad meshing is an important step in reverse engineering; we could patch the quad mesh using **Biquadratic and Bicubic Spline Surfaces.**

   Triangle mesh Quad mesh converted from triangle mesh

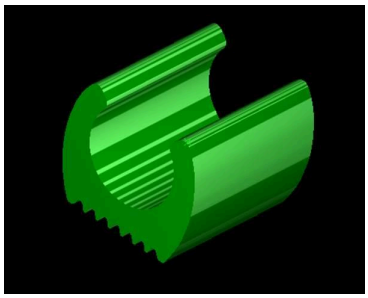



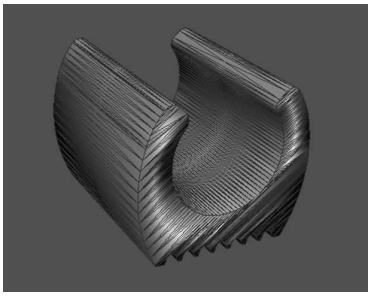
5. Completed section feature curve based modeling strategies for reverse engineering; Used revolve-feature section to create the Solid body;

   Solid Body by revolving profile Original mesh

   Body by extruding section Original mesh



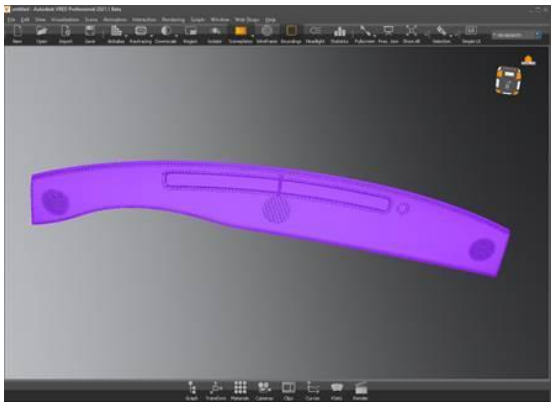


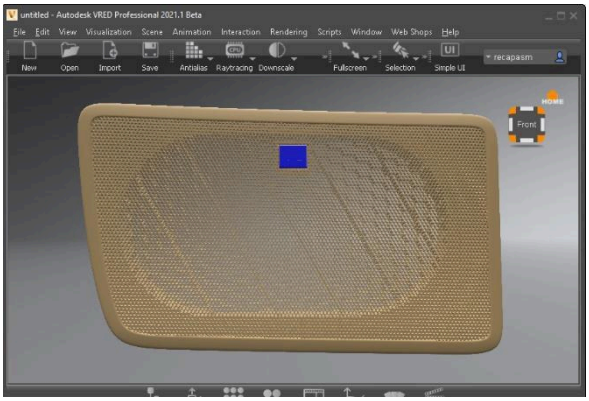
6. Completed project of CATIA Import improvement. **Improved Performance between 30% to 60% for customers.**

Background of performance issues:

- Importing CATIA V5 ~100MB file results in ~4GB body
- Huge memory consumption during CATIA import

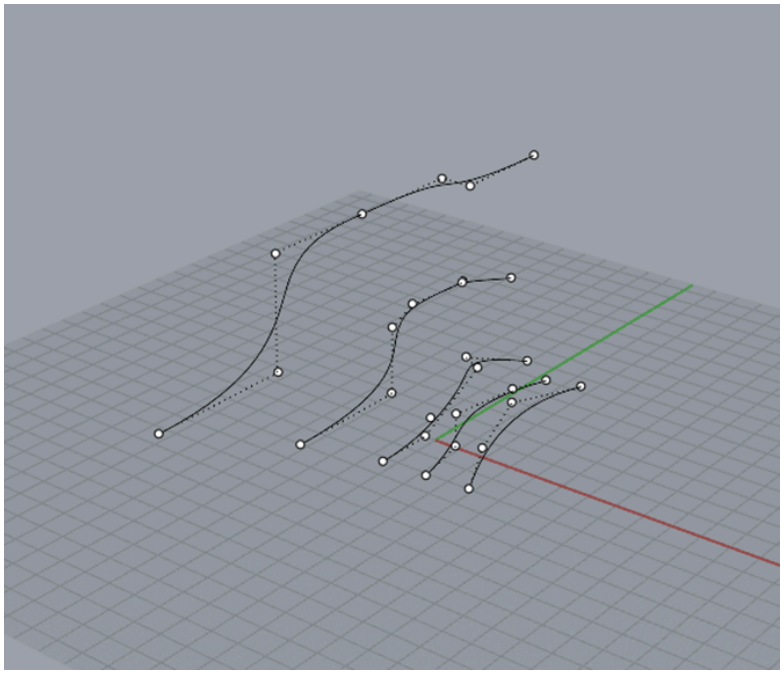
Performance issue: 15 to 18 minutes to load vs Unreal Engine 2 minutes

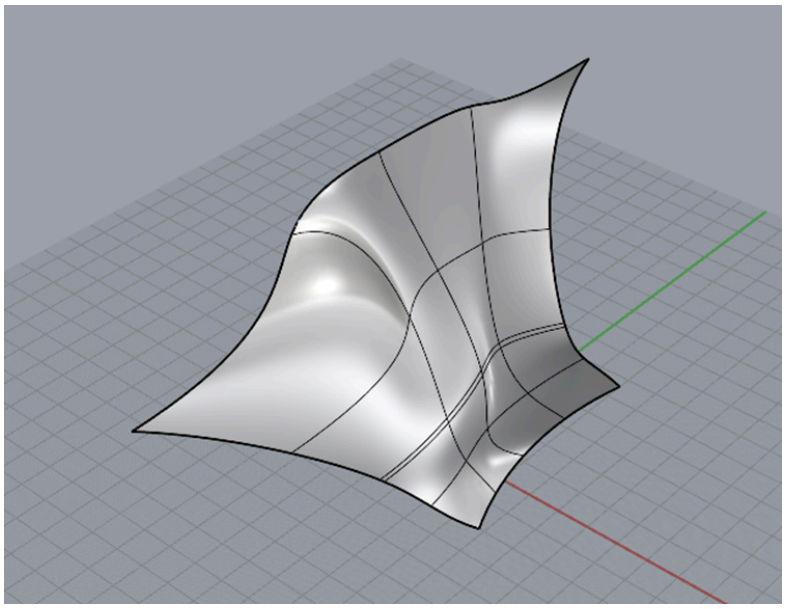




- **Performance improvement by more than 30%, up to 60% on part import cases. The peak memory and file sizes are also significantly improved.**

7. Completed **Loft Surface** project.





8. Completed **Coons Surface** project.