



# ATLAS-GTU TAI WORKSHOP

GEOMETRY DEVELOPMENT FOR THE VISUALIZATION APPLICATIONS-



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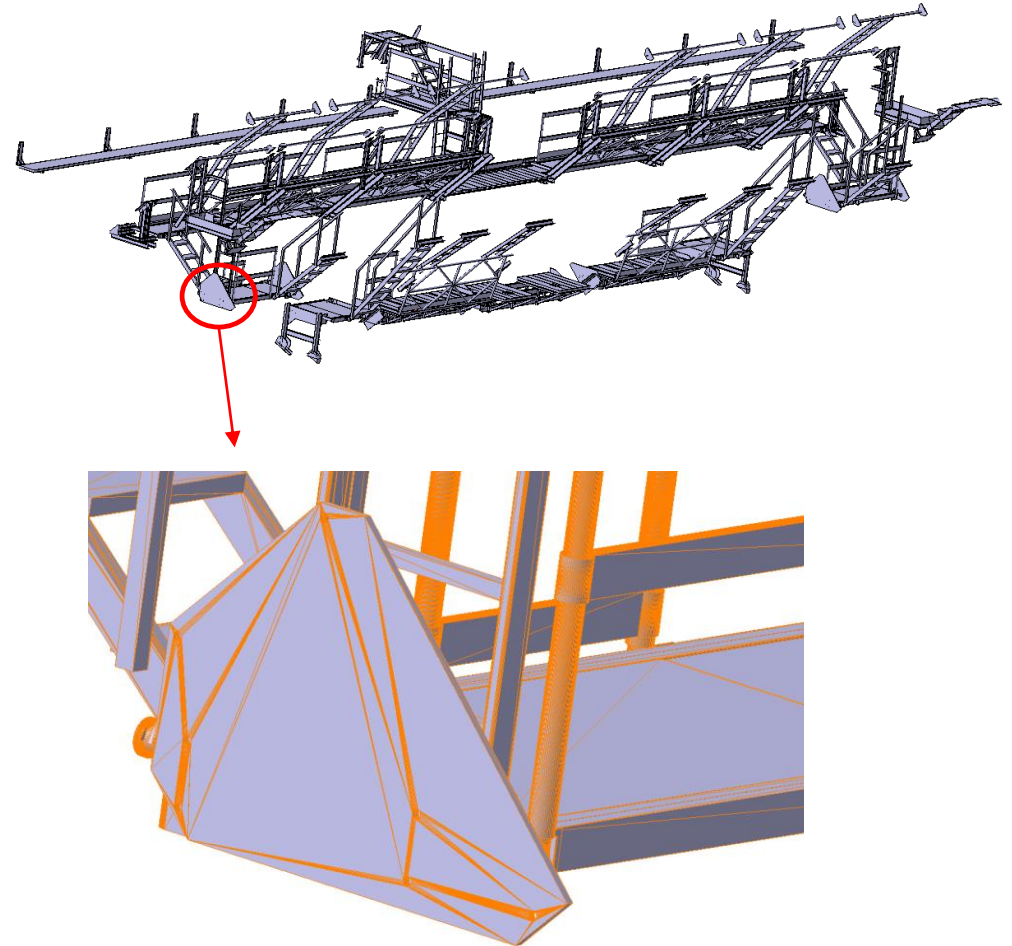
# Simplification

# SIMPLIFICATION

To visualize any geometry you need to use polygons

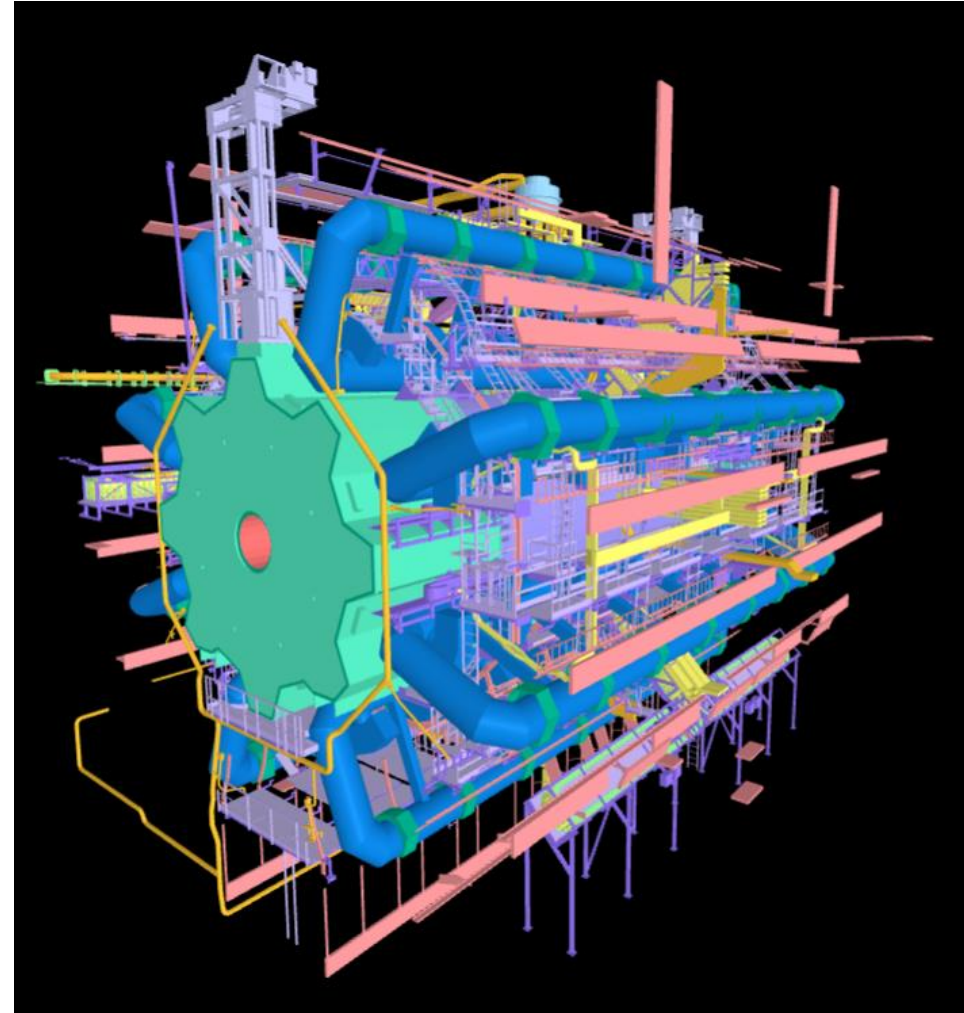
A polygon is a collection of vertices, edges, and faces that define the shape of a polyhedral object in 3D computer graphics and volumetric modeling. The faces are usually triangles, quadrilaterals, or other simple convex polygons.

More polygons load the system more



# SIMPLIFICATION

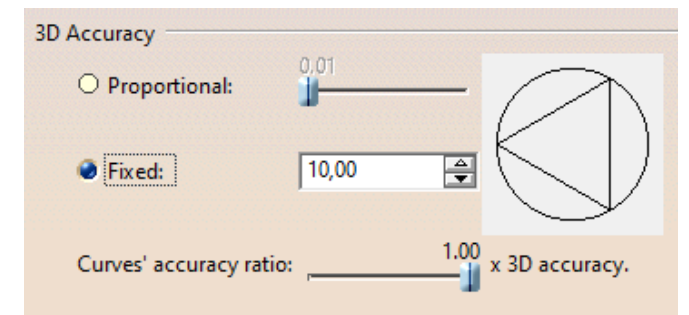
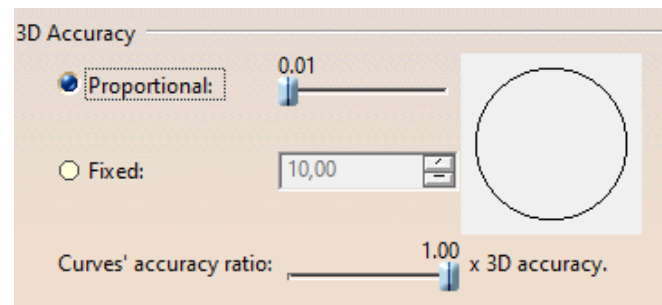
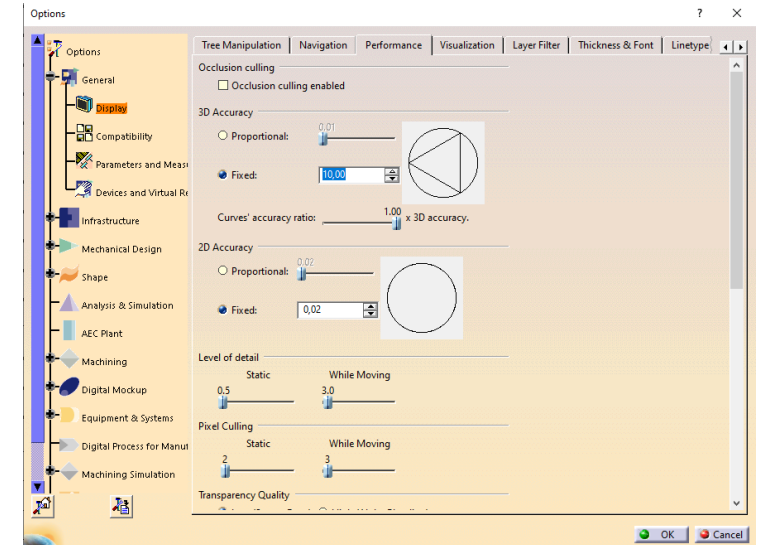
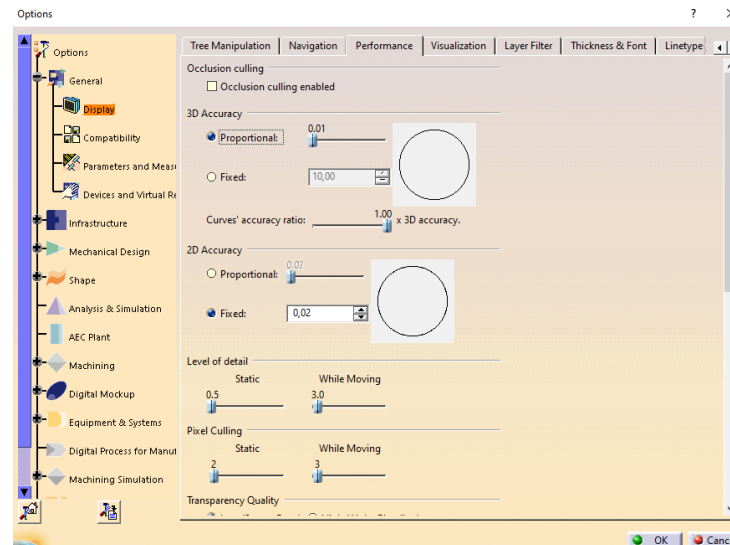
In order to visualize the components of the atlas detector , we use the geometry simplification



# SIMPLIFICATION

In order to reduce the load on the system, we first reduce the approximation.

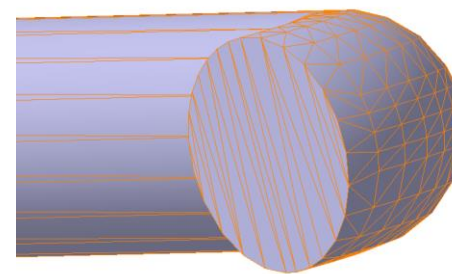
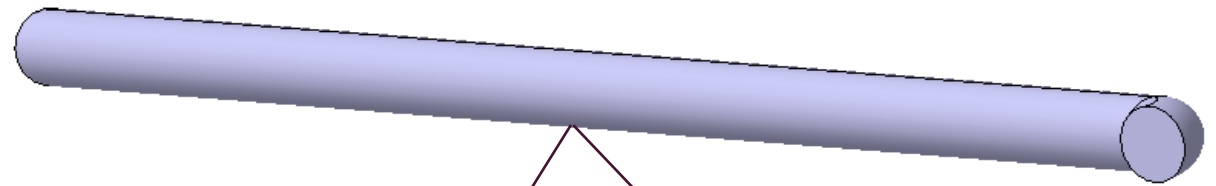
as shown in the figure, we reduce the accuracy of the geometry from 0.1 to 10



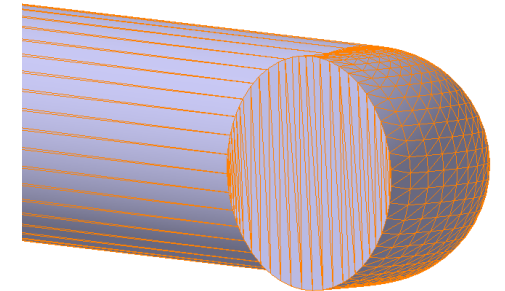
# SIMPLIFICATION

polygons cannot be round. round objects are replaced by polygonal cuboids, but with a large number of these triangles, which resembles a circle

lowering the accuracy of the geometry gives a difference of polygons of about 70.98%



Face: 368



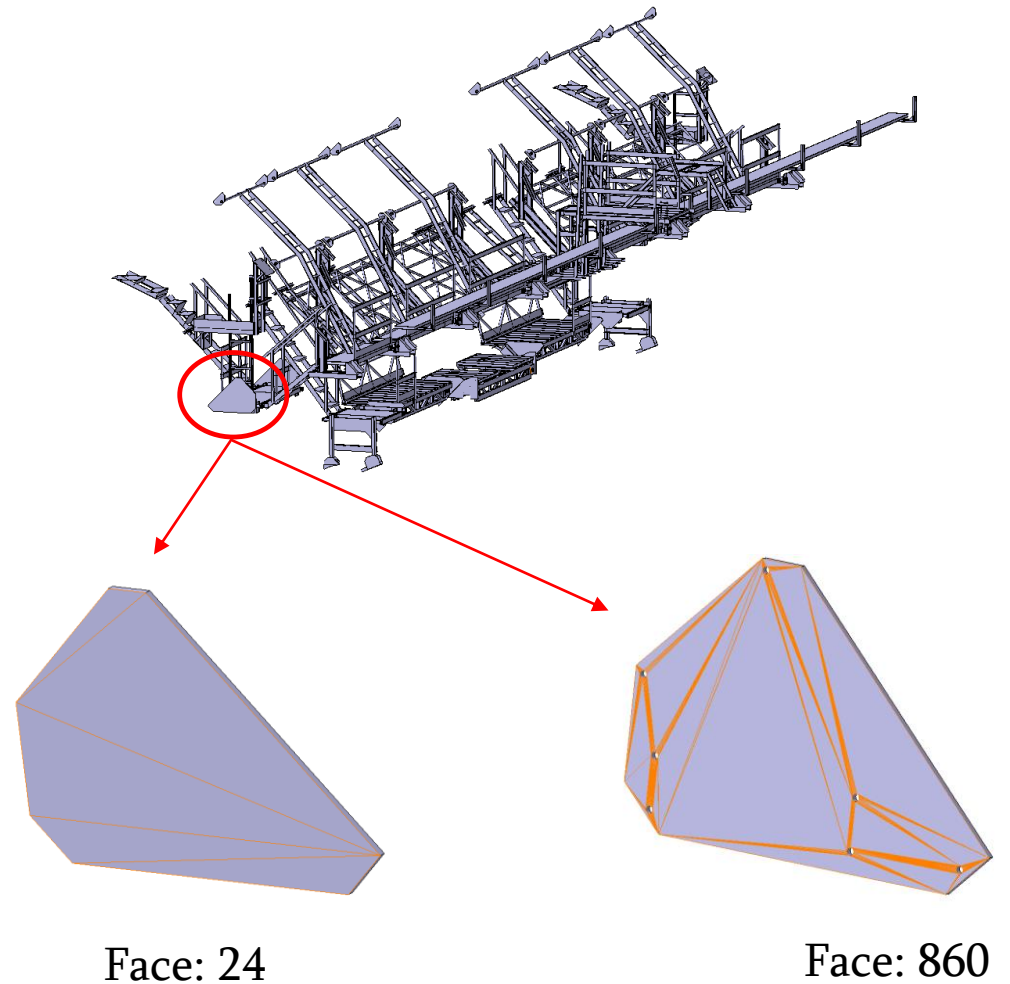
Face: 1268

# SIMPLIFICATION

but reducing the accuracy of the geometry does not always help reduce the load on the system

On the bodies we remove small holes on the geometry

this gives a difference in the number of polygons in some cases up to 98%

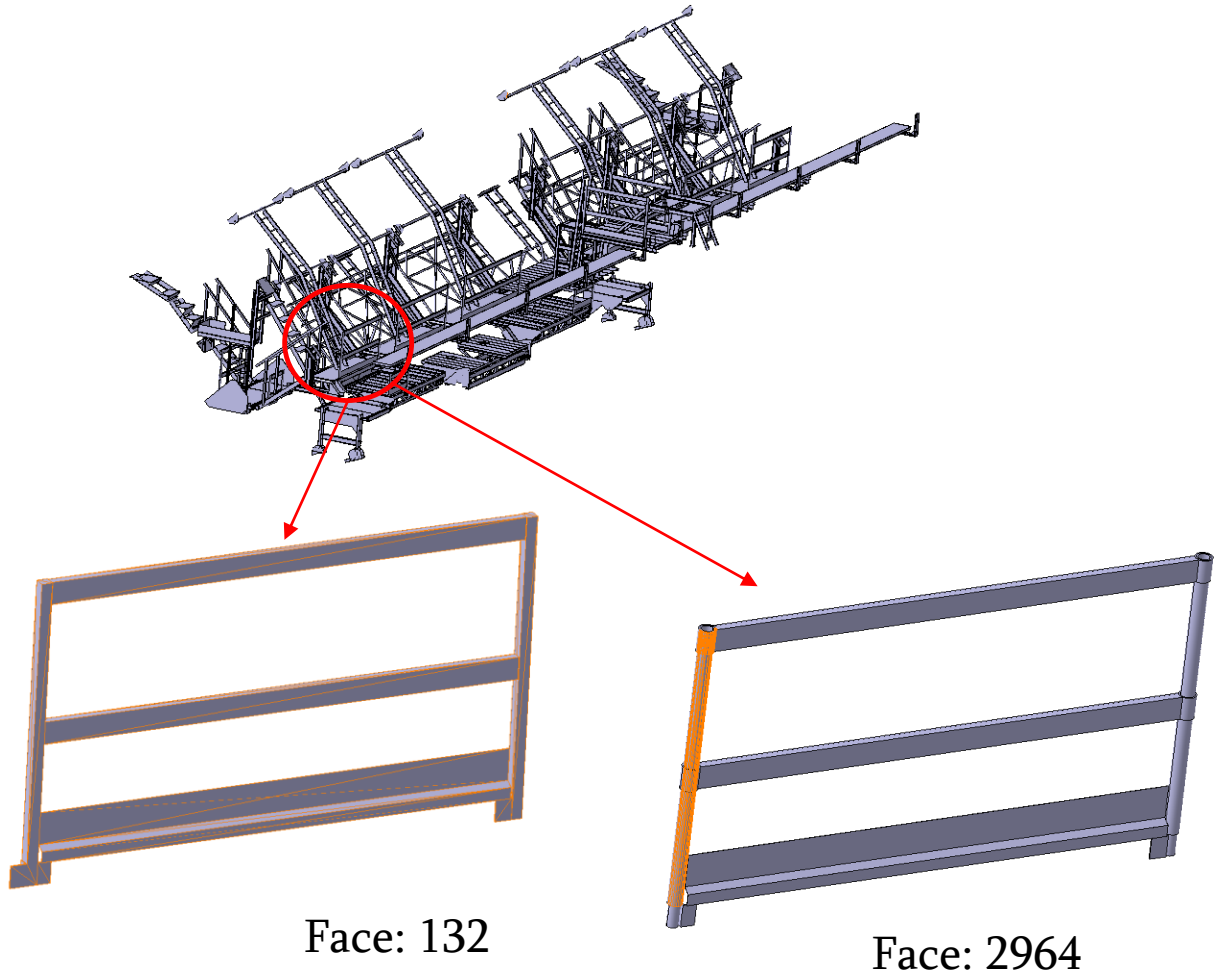


# SIMPLIFICATION

we also change small circles to polygons and fill empty objects

visually the difference is almost imperceptible. But the difference of polygons is about 95.5%

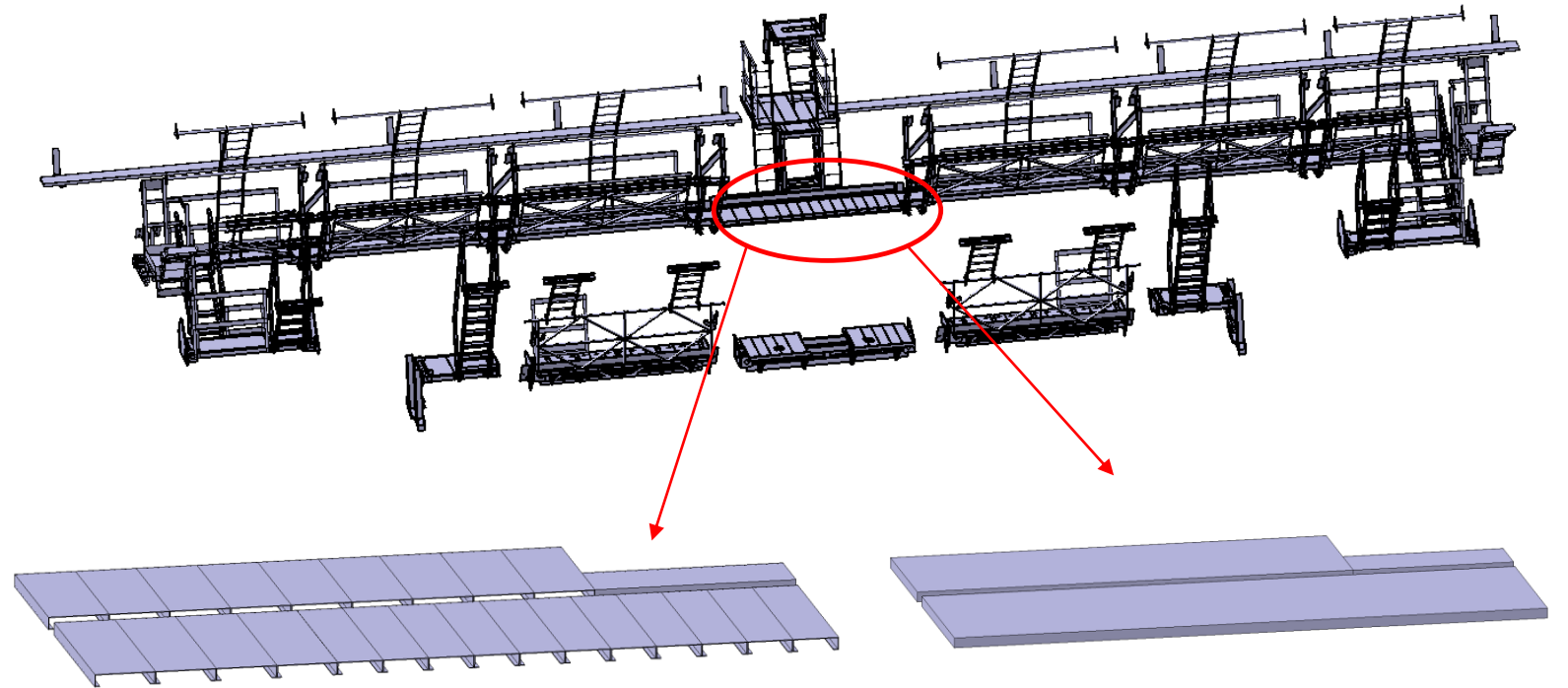
we simplify this way mainly such geometries as: handrails, stairs, and other small round geometries





# SIMPLIFICATION

we also combine several similar objects into one, which also gives difference about 97%

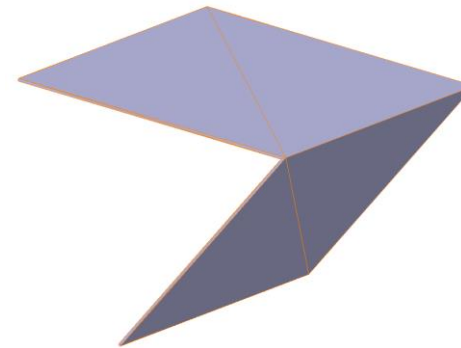
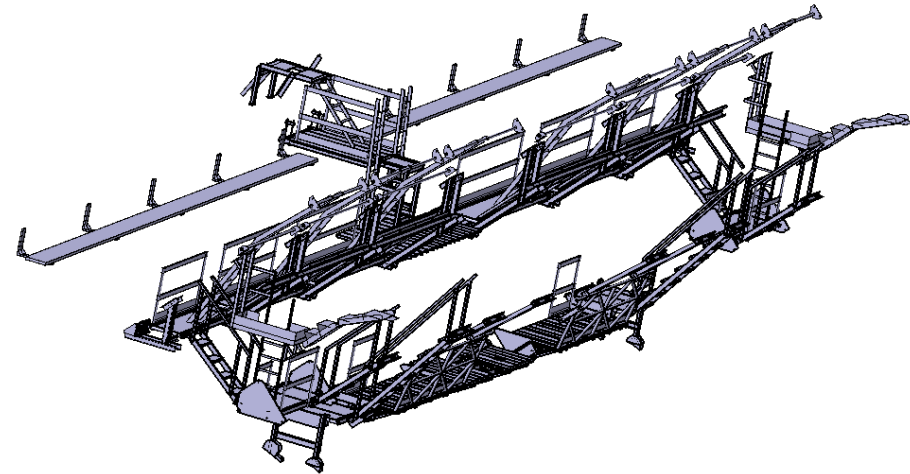


36

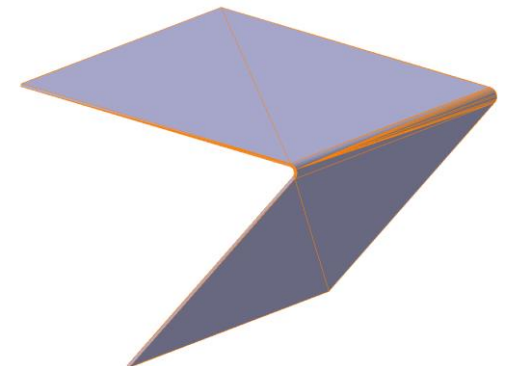
1100

# SIMPLIFICATION

we also remove small roundings that are barely visible, which also reduces the polygons



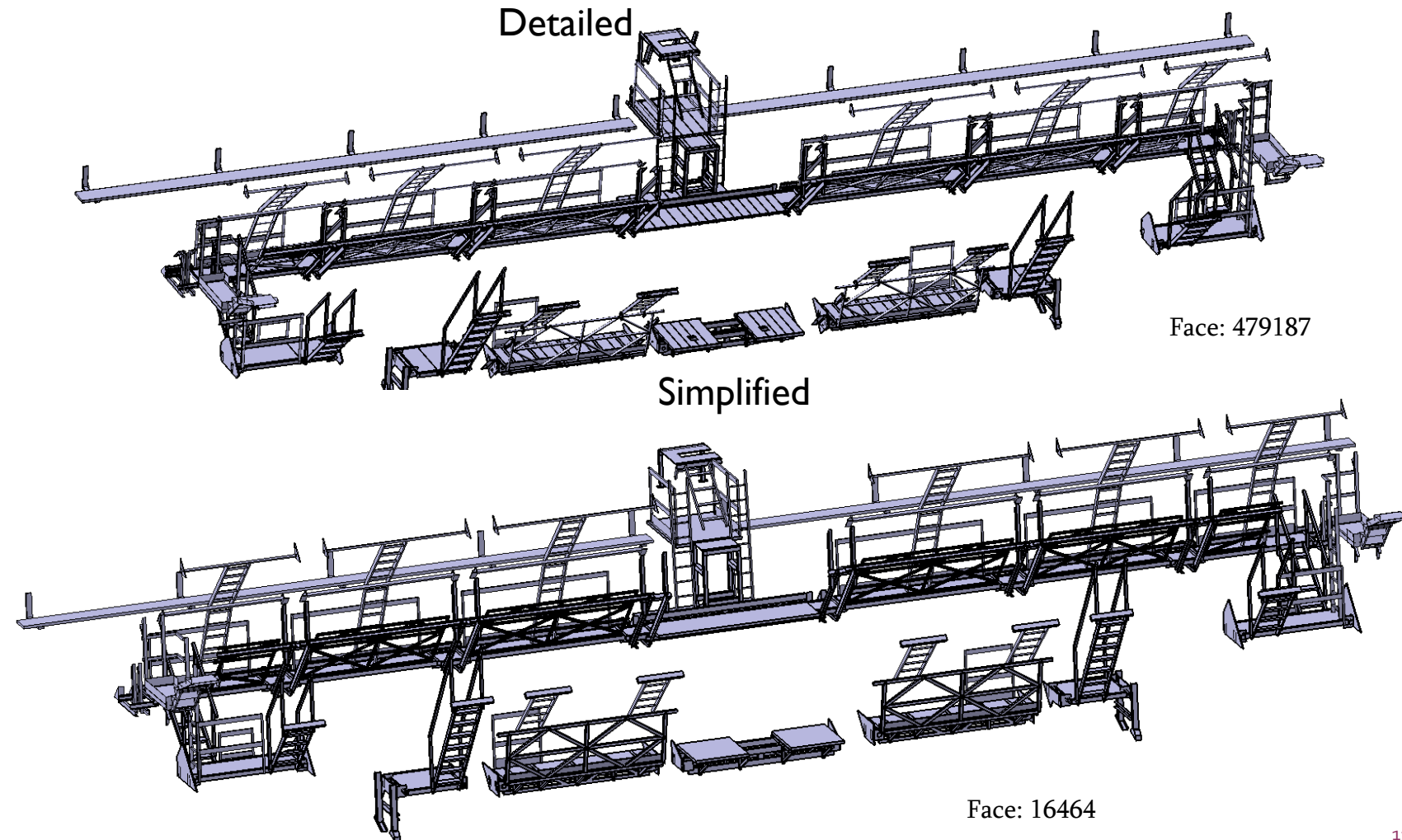
Face: 20



Face: 116

# SIMPLIFICATION

Use the above methods to facilitate the geometry, we get a difference in polygons of about 97%, which significantly affects the system load  
But the visual part is almost indistinguishable



# SIMPLIFICATION

For today, we have simplified 83 atlas detector geometries that can be seen in Tracer

