



# RTX Realism in 3DEXPERIENCE Catia

*Photorealistic Live Rendering by Dassault Systèmes using NVIDIA RTX*

## OVERVIEW

3DEXPERIENCE CATIA is widely used by the automotive industry which relies on its engineering precision to design and produce millions of cars around the world. This demo is a proof of concept (POC) of the CATIA Live Rendering application showing how RTX and XRite AxF integrate to accurately measure and render materials. This allows rapid simulation for perceived quality studies, and efficient decision making on the actual engineering data of a very popular European SUV.

## KEY POINTS

1. The 3D model is the actual engineering data of a production SUV. It is comprised of 10,000 parts and 20M polygons which leverage high-quality AxF scanned materials that match the actual car materials (samples will be on hand at the booth for comparison).
2. This demo also shows Stellar, the Dassault Systems ray tracing engine which, in this POC, includes, for the first time, GPU acceleration leveraging RT Cores through OptiX. This allows rendering with the actual data geometry including actual scanned materials.
3. Running on a **single** NVIDIA RTX6000 GPU, Stellar runs 10 to 20x faster than a rack of 24 CPU-based systems. And it scales up to 5x faster than that with RTX Server!
4. While manipulating the model, CATIA Live Rendering leverages an OpenGL 4.5 real-time engine which has been using PBR materials since 2017.

5. This POC includes High-Quality Ambient Occlusion (HQAO), an effect that approximates the attenuation of light due to occlusion, which is powered by RT Cores. This object-space technique ensures far higher quality than traditional AO screen space technologies, and achieves this in less than 22ms per frame (render the full AO data). HQAO provides an excellent approximation while permitting smooth navigation prior to using Stellar Precise to deliver the final physically correct simulation (allowing it to converge).
6. HQAO leverages OpenGL, Vulkan-OpenGL interop and Vulkan, as well as an NVIDIA Quasi Multi Carlo (QMC) patent and NVIDIA Research paper to compute the AO in object/world space. It is then cached so only new elements in the 3D scene (those which have not been seen before) are recomputed. For example, when zooming in, some details show up and a more precise AO needs to be recomputed, or if the camera is moving, only new elements appearing will be recomputed.
7. Dassault Systèmes is leveraging NVIDIA RTX Technology to make 3DEXPERIENCE an integrated experience when viewed in VR to interactive GI on 4K displays.

## QUOTATION

*“The performance of NVIDIA RTX will give 3DEXPERIENCE users a new level of visual realism & real-time experience to Design in the Age of Experience”*

**Xavier Melkonian, Director of CATIA Design Portfolio.**

Below are screenshots showing HQAO ON (RTX ON) and OFF (RTX OFF).





