

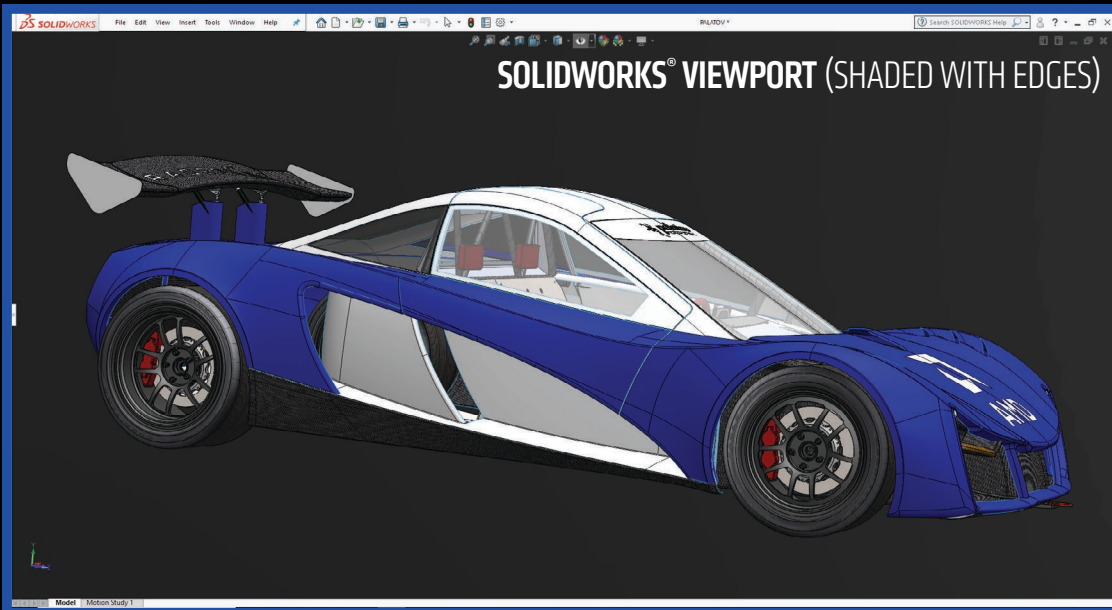
SOLIDWORKS® 2019 VISUALIZATION & VR GUIDE



RADEON PRO

FOUR WAYS TO VISUALIZE A SOLIDWORKS

Designers and engineers have several options when it comes to visualizing SOLIDWORKS® designs – from enhanced realism in the viewport with RealView to photorealistic stills and animations with a physically-based renderer. Then, for a fully immersive experience, models can even be taken into Virtual Reality (VR).

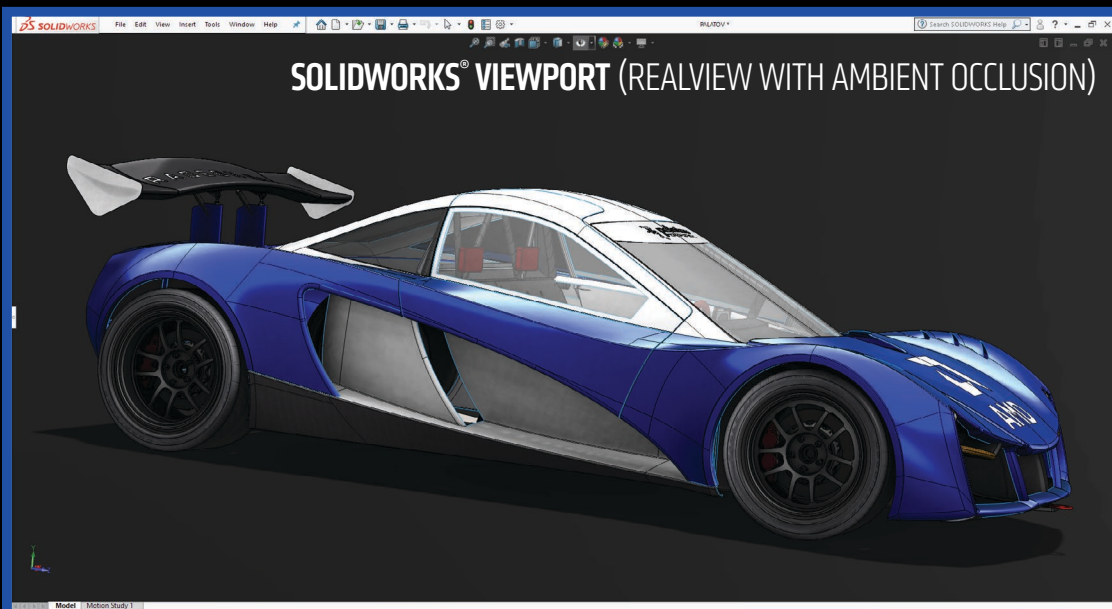


Shaded with edges is the most popular real-time viewport used in SOLIDWORKS®. It may not be the most visually attractive, but it does a great job of highlighting the topology of a model, clearly showing how parts interact with each other.

In this automotive model, users can get a good understanding of the complex surface geometry.

Most modern professional graphics cards, including the AMD Radeon™ Pro WX 4100 and WX 5100, should deliver good 3D performance in this mode.

For particularly large assemblies, when the new graphics engine in SOLIDWORKS® 2019 is enabled (see page 4), a more powerful graphics card such as the AMD Radeon™ Pro WX 7100, should offer an even smoother interactive experience.



RealView delivers much more realistic effects inside the viewport, which helps bring SOLIDWORKS® models to life in an interactive 3D environment.

This OpenGL®-accelerated viewing mode supports floor shadows, environment reflections and multi-colored effects such as car paint. In this automotive model, Ambient Occlusion (AO) is also enabled to enhance the shadows and add more depth and realism to the scene. This is particularly noticeable around the wheels where darker shadows appear in more occluded (hidden) areas.

RealView is only supported on a professional graphics card such as AMD Radeon™ Pro. It puts much bigger demands on the GPU, so a higher-end card like the Radeon™ Pro WX 7100 is recommended.

MODEL



Radeon™ ProRender for SOLIDWORKS® is a powerful physically-based renderer that lets designers and engineers produce stunning photorealistic images and animations with a few simple mouse clicks. The renderer is fully integrated into SOLIDWORKS® as an add-in and works with SOLIDWORKS® appearances to render geometry accurately.

In this automotive model, shadows and reflections are much more realistic than when the same model is displayed in the native viewport.

Physically-based rendering is computationally intensive so can take minutes or tens of minutes to render a scene at high resolutions. Radeon™ ProRender works with CPUs but will benefit most from one or more high-end GPUs such as the AMD Radeon™ Pro WX 8200 or WX 9100.



Unreal® Engine is best known for powering video games, but the popular 3D engine is also being used extensively in design and engineering nowadays.

The software can be used to visualize designs in a realistic, real-time environment as well as in Virtual Reality (VR).

The visual quality is excellent, as can be seen with this automotive model, but not as realistic as a physically-based renderer. Instead of simulating light precisely, Unreal® Engine uses traditional rasterization techniques to give an approximation for light.

To deliver results in real-time, the software can place big demands on the GPU. A high-end graphics card such as the AMD Radeon™ Pro WX 8200 or WX 9100 is recommended particularly when taking designs into VR.

LARGE ASSEMBLIES, BIG PERFORMANCE

SOLIDWORKS® 2019 features a brand new graphics engine that can deliver huge 3D performance benefits for those working with large assemblies on a workstation with a powerful professional GPU

SOLIDWORKS® design and engineering models have grown in size dramatically over the years. Today, it is not unheard of for assemblies to feature 10,000 parts, a combination of solids, surfaces, and mechanical and electrical components. However, while datasets have increased in complexity, the graphics engine that powers the SOLIDWORKS® viewport has remained largely the same. Some of the core code dates back 15 years when SOLIDWORKS® was still relatively new and graphics cards were completely different beasts to the powerful parallel processors they are today.

To take full advantage of the power of modern professional graphics cards, SOLIDWORKS® 2019 features a brand-new graphics engine that can significantly increase 3D performance when working with large assemblies.

Previously, when assemblies reached a certain size and complexity, the workstation's Central Processing Unit (CPU) would become the 3D performance bottleneck. No matter how powerful the workstation's professional Graphics Processing Unit (GPU) was, 3D performance would not increase.

To the designer, this could have a dramatic impact on productivity by taking significantly longer to re-position the 3D model on screen. Very basic view operations such as zoom, pan and rotate could become choppy, as the GPU could only render at a few frames per second. And, as the assembly did not respond instantly to the movement of the mouse, the user had a tendency

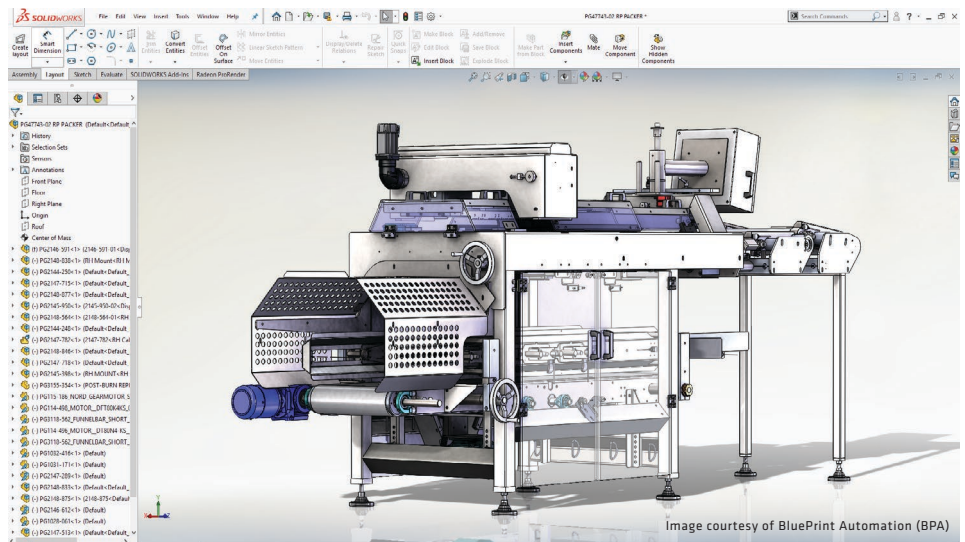


Image courtesy of Blueprint Automation (BPA)

to over compensate, in much the same way one does when steering a boat for the first time.

To help improve 3D performance and user experience when working with large models, SOLIDWORKS® has traditionally fallen back on 'large assembly mode'. This automatically disables RealView and shadows thus compromising the level of realism in the viewport. It also sets the level of detail to low, so faces disappear while rotating or moving the model.

LARGE ASSEMBLY CONTROL

With the new graphics engine in SOLIDWORKS® 2019, trade-offs in 3D performance or visual

fidelity could become a thing of the past. With more of the graphics calculations now done on the GPU, rather than the CPU, providing the right graphics hardware is in place, users should experience significantly better 3D performance when working with large assemblies, even when large assembly mode is turned off.

To put this in perspective, the graph to the right shows the average frame rate for manually rotating a complex aircraft assembly with 17M triangles and over 2,400 components. The improvement in this case was rather staggering - it was the difference between having a smooth interactive viewport versus

AMD Radeon™ Pro - the professional GPU for SOLIDWORKS®

AMD has a long-standing technology partnership and product alignment with Dassault Systèmes, and its Radeon™ Pro workstation graphics cards are fully certified for SOLIDWORKS® 2019 on both Microsoft® Windows® 7 and Windows® 10.

Graphics-level certification is a critical part of building a productive CAD pipeline, as it ensures that the user's workstation is rock

solid and compatible with new features and optimizations as new SOLIDWORKS® versions come to market. Examples include Order Independent Transparency (OIT) that uses the GPU to render semi-transparent objects faster and more accurately, and Ambient Occlusion (AO), a real-time lighting effect that sits on top of RealView and is designed to simulate the way light radiates in the real

world more accurately.

AMD's engineering teams work very closely with Dassault Systèmes throughout the application development and certification processes to address potential performance optimizations and bugs long before products ship to customers.

For a broader view of the quality of AMD's drivers, a recent independent study from QA

Consultants, which tested a pool of six AMD and six NVIDIA® graphics accelerators, concluded that AMD has the most stable graphics driver in the industry.



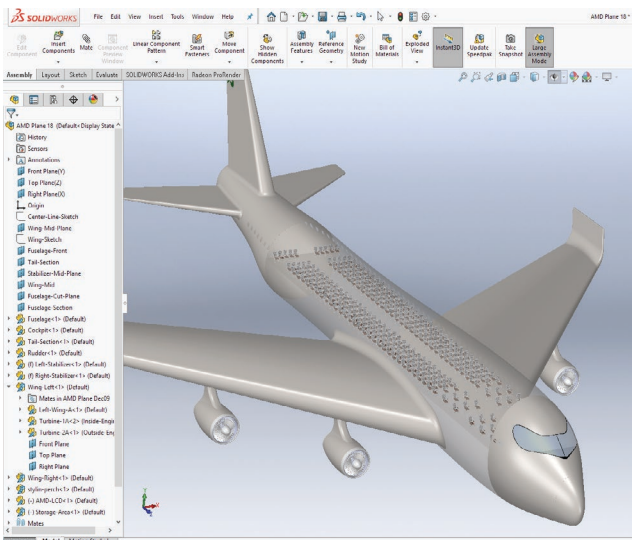
▲ Touch, gesture and digital pens for design and markup

SOLIDWORKS® 2019 includes several enhancements to its touch and gesture sketching capabilities to help users get the most out of touch-enabled mobile workstations, such as the Dell Precision 5530 2-in-1 and HP® ZBook 15u.

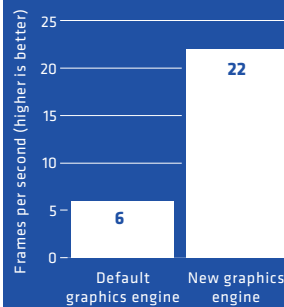
SOLIDWORKS® can now automatically convert hand sketches into editable splines to be used as a starting point for 3D modeling. Object recognition also extends to shapes, with hand drawn slot shapes automatically converting into SOLIDWORKS® slot sketch entities.

To help minimize mouse and keyboard input, users can also hand write dimensions on the screen, with SOLIDWORKS® converting them into fully associative driving dimensions. Sketching also extends to design review, allowing markups and notes to be added directly to the 3D model.

In addition to fingers and pens, designers can now use the Microsoft® Surface Dial to pan, zoom, rotate and cycle through different commands on any Windows® 10 device.



▲ Large assembly model rotation in SOLIDWORKS® 2019



Complex aircraft assembly with 17 million triangles and over 2,400 components. Tested with Radeon™ Pro WX 8200 graphics card

one that was very choppy and not responsive. This can translate directly to user productivity and can revolutionize workflows by allowing designers to work with increasingly complex assemblies that were simply unpleasant to work with in the past.

By reducing the CPU bottleneck, SOLIDWORKS® is also able to scale better with graphics card hardware, meaning users can further accelerate dynamic performance with a higher end graphics card, such as the AMD Radeon™ Pro WX 7100 or WX 8200. For smaller SOLIDWORKS® assemblies, the AMD Radeon™ Pro WX 4100 or WX 5100 is a good choice (see

▲ Test drive the engine

In SOLIDWORKS® 2019 SP0, the new graphics engine is a beta feature, so it is not enabled by default when SOLIDWORKS® first launches.

To try it out, simply go to Tools > Options > Performance and tick the checkbox at the bottom of the page. SOLIDWORKS® will then need to be restarted.

Note that there will be a warning popup about the experimental nature of this feature.

▲ Workstations for modeling and viewport visualization

The HP® Z2 Mini is a tiny workstation with an elegant design that offers plenty of power for mainstream SOLIDWORKS® workflows. It features an AMD Radeon™ Pro WX 4150 GPU (4GB) and a 6 core CPU.

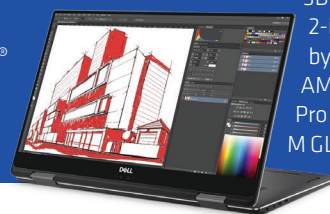
For larger SOLIDWORKS® assemblies or better 3D performance with RealView, consider the HP® Z4 or Dell Precision 5820 with the AMD Radeon™ Pro WX 7100 (8GB).

The Dell Precision™ 5530 2-in-1 is a new generation mobile workstation, designed for precision pen and touch interaction. It features a 360-degree hinge, so it can function as a laptop or a tablet, and a next generation 15.6-inch 4K Infinity display. For

3D modeling, the 2-in-1 is powered by professional AMD Radeon™ Pro WX Vega M GL graphics.

The HP® ZBook 14u and 15u are very thin and light mobile workstations with a premium metallic finish. They feature 14-inch and 15.6-inch displays respectively with optional 4K touch. For 3D modeling, both laptops are powered by a professional

AMD Radeon™ Pro WX 3100 GPU, which is recommended for part and small assembly modeling.



THE IMPACT OF PHOTOREALISM

To take visualization to the next level with ray traced rendering, SOLIDWORKS® users have several options for creating stunning photorealistic stills and animations.

Designers and engineers can get great results in the viewport with SOLIDWORKS® RealView and Ambient Occlusion. The results are instant and fully interactive, giving real-time feedback on new design iterations and the ability to explore new forms and materials in tandem.

The one trade off with viewport visualization is visual fidelity, however. Lighting is approximated, so materials, shadows and reflections are a best guess of how a product will look when manufactured. To take visualization to the next level, designers and engineers should consider photorealistic ray traced rendering.

Ray trace rendering works by simulating how light behaves in the real world by tracing rays of light as they reflect and refract off objects within a scene. The technique is very computationally intensive as it is based on real world physics, so it typically takes minutes to deliver one rendered image. However, results are significantly more realistic, providing much greater insight into the look and feel of a product, as well as the exact choice of materials.

Designers and engineers with SOLIDWORKS® Professional or Premium have two included options for ray traced rendering: PhotoView360™ and SOLIDWORKS® Visualize.

PhotoView 360 is completely embedded within SOLIDWORKS®, so any changes made to the SOLIDWORKS® model will update automatically in PhotoView 360. Scenes are then rendered with multi-core CPUs.

SOLIDWORKS® Visualize is a standalone



application for photorealistic rendering and animation that uses a “Live CAD Update” to update SOLIDWORKS® models. Scenes are rendered using GPUs or CPUs.

AMD offers a third option for ray traced rendering, Radeon™ ProRender, that is free to all SOLIDWORKS® customers, including those with SOLIDWORKS® Standard. The Radeon™ ProRender add-in supports physically correct materials and automatically translates SOLIDWORKS® appearances. It is also easy to use: simply position the model within the SOLIDWORKS® viewport, then click render. Scenes are rendered using GPUs or CPUs.

▲ Design and render at the same time

One of the challenges of ray traced rendering is its large computational demand. With CPU-based renderers, unless the workstation is manually tuned, and CPU cores are ring fenced, it can grind to a halt. This can make it hard to do any other work on the same workstation until the render has finished.

This problem doesn't exist when rendering with AMD Radeon™ Pro GPUs. The GPU's asynchronous compute engine allows compute and graphics tasks to be performed at the same time. Even when the GPU is crunching through a render in Radeon™ ProRender or any other GPU-based renderer, it will remain snappy and responsive when the designer needs to move the 3D CAD model in the SOLIDWORKS® viewport.

▲ eGPU - power on demand for GPU rendering

One of the major benefits that GPU renderers have over CPU renderers is the scalability of hardware. More GPUs = faster results and it's easy to add a second or third GPU to an expandable workstation.

This is great for some desktop machines, but most mobile workstations are limited to a single GPU. Furthermore, the most powerful GPUs are only

available in 17.3-inch mobile workstations which are less practical for day to day travel.

But GPUs do not have to reside inside the workstation. SOLIDWORKS® users can now boost GPU rendering performance by plugging in an external GPU (eGPU) solution, such as the Sonnet™ eGFX Breakaway Box 650 fitted with a high-end Radeon™ Pro WX 8200 or WX 9100 GPU.

In order to move data in and out of the GPU quickly, eGPU enclosures use Thunderbolt™ 3, a high bandwidth interface that is common in new generation mobile workstations.

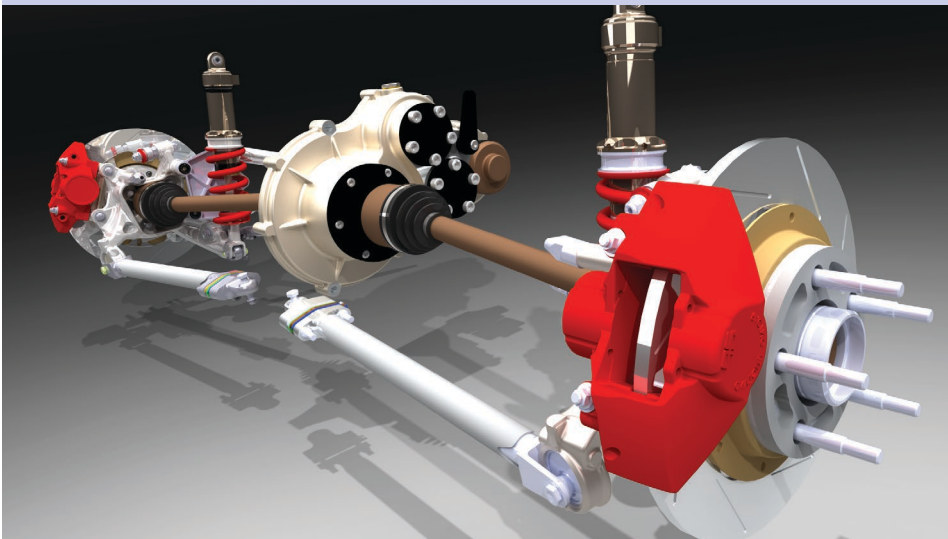
Using the thin and light HP® ZBook 15u as an example, designers and engineers can use its built-in Radeon™ Pro WX 3100 GPU for part and assembly modeling, then plug in an eGPU

when more compute horsepower is required for physically based rendering, game engine visualization or VR.



PHYSICALLY-BASED GPU RENDERING MADE EASY

Deeply embedded inside SOLIDWORKS® and easy to use, Radeon™ ProRender, the powerful physically-based GPU renderer, is an excellent choice for designers and engineers. What's more, it's free to use.



AMD Radeon™ ProRender for SOLIDWORKS® is a physically-based renderer that works with SOLIDWORKS® 2016 and above. The add-in is free to download and works directly inside SOLIDWORKS®. It is designed to be easy to use. Even non-experts can produce great results.

Unlike most physically-based renderers, which rely on the workstation's Central Processing Unit (CPU) for the complex ray tracing calculations, AMD Radeon™ ProRender is based on OpenCL™, an open standard, so it can use CPUs or Graphics Processing Units (GPUs).

Once installed, Radeon™ ProRender is deeply embedded inside the SOLIDWORKS® environment and has its own tab in the SOLIDWORKS® User Interface.

The software automatically maps all of the different SOLIDWORKS® appearances to Radeon™ ProRender materials.

Users simply position the assembly within the SOLIDWORKS® viewport, apply a SOLIDWORKS® scene for lighting and context, then click render. The Radeon™ ProRender application window will then open, and the image will refine with each iteration.

By default, the rendering window shows the same view as the current window in SOLIDWORKS®. As a result, when any edits are made, or the orientation of the model changes, the render will start again automatically. This can be overridden by the user allowing new designs to be explored inside SOLIDWORKS®, while Radeon™ ProRender renders in the background.

Rendering times vary from a few minutes to several hours depending on the desired quality of the final image. This depends on a number of factors including the complexity of the SOLIDWORKS® model, the output resolution, the image quality settings and the performance of the workstation's GPU.

Radeon™ ProRender can be used to render stills or animations based on a SOLIDWORKS® motion study. Decals can also be applied to the model on flat or curved surfaces.

The software includes several post effects, which allow users to tweak the scene after the render has finished without having to do the heavy computation again. For example, users can adjust the exposure to increase brightness if the initial scene is too dark.

Once the Radeon™ ProRender asset has been created, it can be used as the starting point for a real time game engine or VR experience. Simply import the scene into Unreal® Engine using the AMD Radeon™ ProRender Game Engine Importer and it will automatically bring over geometry, materials and lighting.

▲ Workstations for GPU-accelerated photorealistic visualization (Radeon™ ProRender)

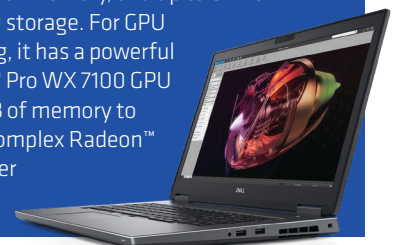
The AMD Radeon™ Pro WX 7100, WX 8200 or WX 9100 are good choices for GPU rendering. They not only deliver the computational performance that can render scenes quickly but have plenty of GPU memory to store data for large scenes. This is particularly important when rendering at high resolutions.

Both the HP® Z4 and Dell Precision™ 5820 can support one or two high-end GPUs. See the VR section on page 11 for more on these desktop workstations.



The Dell Precision™ 5720 is a premium all-in-one desktop workstation with a stunning integrated 27-inch UltraSharp™ 4K Ultra HD display with 100% Adobe® RGB color gamut. The compact system includes a quad core processor, up to 64GB memory and a powerful AMD Radeon™ Pro WX 7100 GPU with 8GB GDDR5 of dedicated memory.

The Dell Precision™ 7730 is a premium 17-inch mobile workstation that combines impressive performance with a lightweight design. It features a powerful 6-core processor, up to 128GB of memory, and up to 8TB of PCIe SSD storage. For GPU rendering, it has a powerful Radeon™ Pro WX 7100 GPU with 8GB of memory to handle complex Radeon™ ProRender scenes.

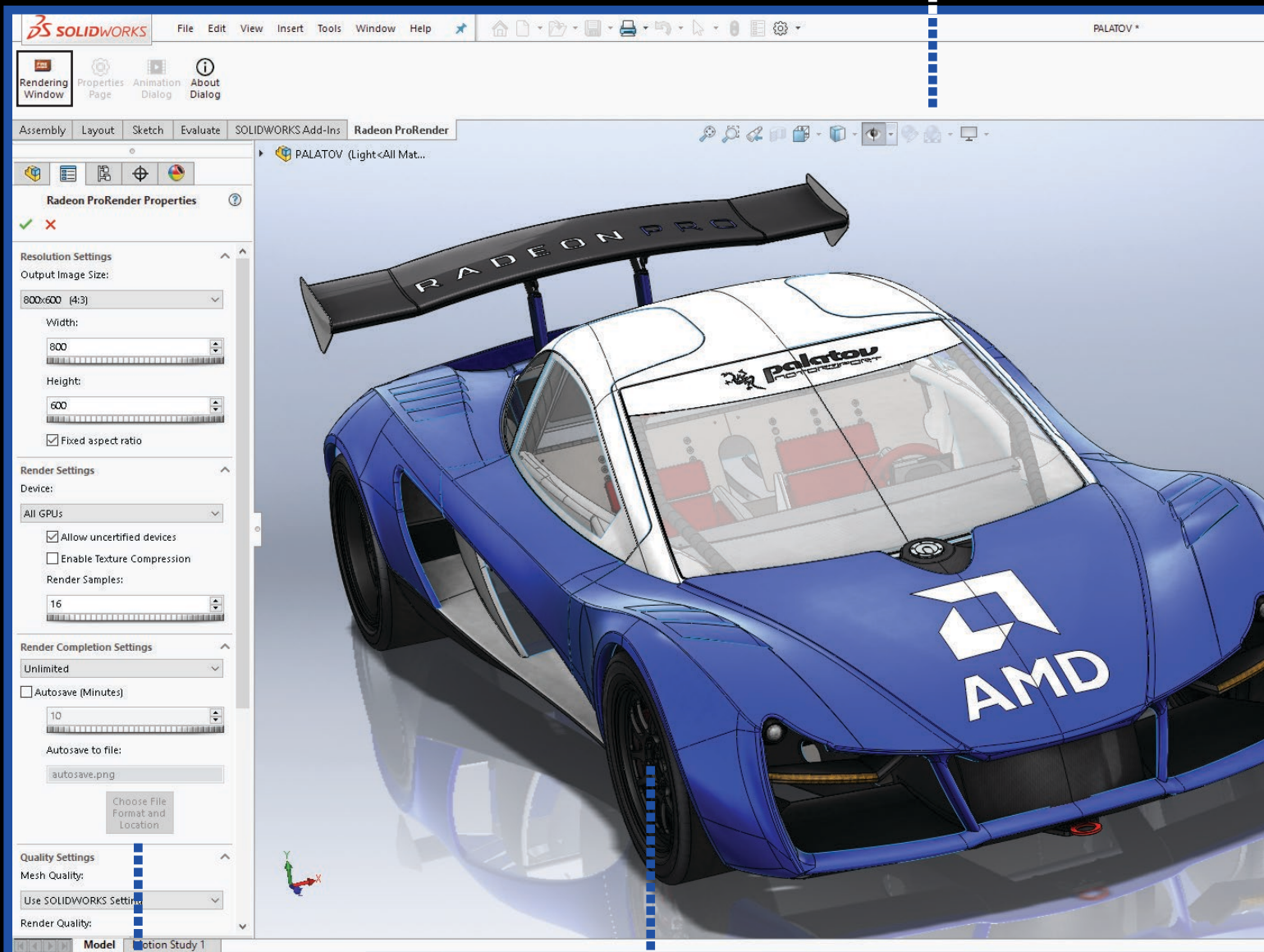


ANATOMY OF A SOLIDWORKS® SCENE (WITH

Time spent setting up a scene in SOLIDWORKS® can pay dividends when looking to bring models to life with Radeon™ ProRender.

▲ PERSPECTIVE

Orthogonal views are great for precise design, but they don't match how a product would look in real life. Switching to perspective view makes for a much better visualization. For even more realism investigate cameras (see right).



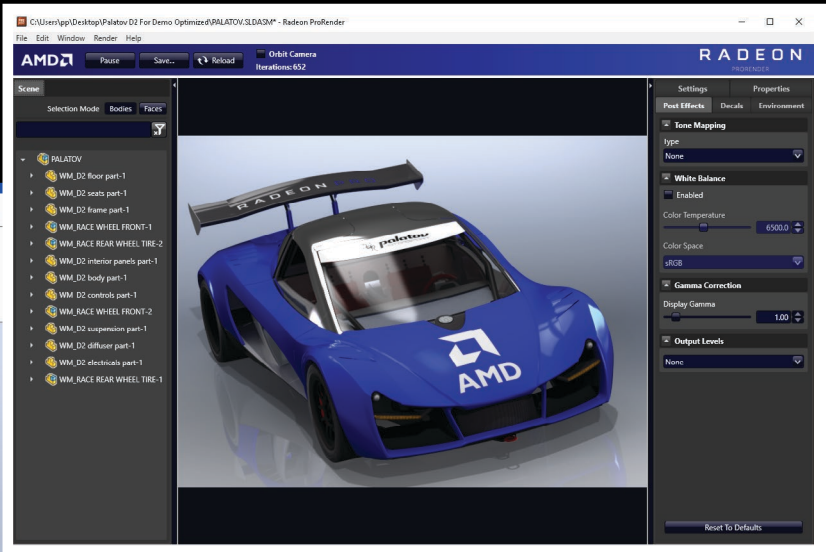
▲ PRORENDER PROPERTIES

Radeon™ ProRender is available directly inside SOLIDWORKS® and has its own tab. With an emphasis on ease-of-use, the software only has a small number of settings to control output. These include resolution, the number of anti-aliasing samples (the higher the number, the smoother the curves and less jagged the edges) and overall image quality.

▲ APPEARANCES

When a SOLIDWORKS® part is given a physical material, it is also assigned a default appearance which emulates the look of the material. All of the different SOLIDWORKS® appearances have been mapped to Radeon™ ProRender, so what you see in RealView should give a good approximation of what to expect in a Radeon™ ProRender rendering. Appearances can be changed by dragging and dropping them onto faces, bodies or parts. This can be useful when parts are painted or have different finishes.

RADEON™ PRORENDER)



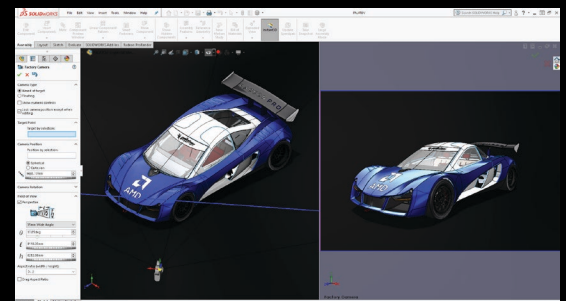
▲ PRORENDER RENDERING WINDOW

The 'rendering window' is launched from the Radeon™ ProRender tab. As soon as the model is loaded into GPU memory, the render starts automatically. The initial image will be quite rough but, as Radeon™ ProRender is a progressive renderer, the quality will increase with each pass.

By default, the rendering window renders exactly what is shown in the SOLIDWORKS® viewport to give quick feedback as designs evolve. The two views can also be unlinked, which allows the user to continue to design in SOLIDWORKS® while Radeon™ ProRender renders in the background. This also allows the user to tweak the view in the rendering window to get the perfect angle.

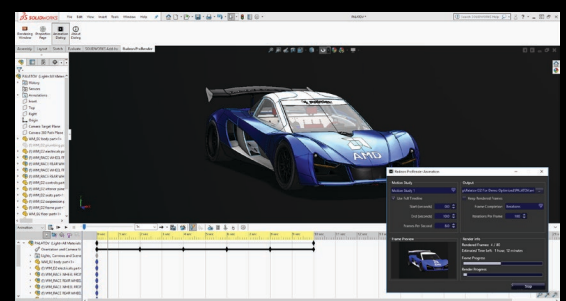
▲ CAMERAS

Models can be moved into position using standard SOLIDWORKS® navigation (pan, zoom, rotate etc.) But cameras offer more control and can make the rendering look more dynamic. SOLIDWORKS® cameras are analogous to physical photographic equipment and there are controls for aspect ratio, focus and camera position.



▲ ANIMATIONS

Radeon™ ProRender can also be used to render animations. First, set up a standard SOLIDWORKS® motion study (a turntable, for example). The software will then render each frame in turn and output the animation as an AVI file. Users have control over the number of frames per second and the output quality.



Drag and drop scenes anywhere into the graphics view.



▲ SCENES

SOLIDWORKS® comes with several pre-set scenes to help visualize designs in terms of lighting and context. Basic scenes offer a variety of color backgrounds and lighting conditions. Studio scenes are designed to replicate photography studios. Presentation scenes add real world backgrounds. HDRI-based environments and scenes can also be imported from externally sourced HDRI libraries to better match your requirements and the context for your product.

BRING PRODUCTS TO LIFE IN VR

Viewing a 3D CAD model on a 2D display is an essential part of design, but VR can take things to the next level, allowing everyone to experience virtual prototypes as if they were real.



Virtual Reality (VR) is starting to have a huge impact across all areas of design, engineering and manufacturing. For years it was very costly, making it the preserve of large automotive and aerospace firms. Now, with affordable Head Mounted Displays (HMDs) like the HTC VIVE Pro or Oculus Rift, firms of all sizes can benefit.

With VR, virtual prototypes can be experienced at a real-world scale, giving the feeling of a physical connection. There are obvious benefits for large products, such as heavy machinery or manufacturing production lines, where physical prototyping is costly and not always practical. However, VR can also aid development of smaller products which can be experienced in the context of where they will be used.

Identifying and resolving issues early on in the development process, digitally, can save money and reduce time to market.

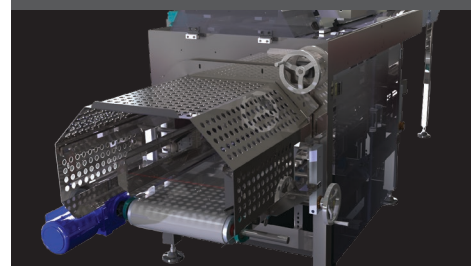
VR allows designers and engineers to

assess how a product will perform and then validate the design. This can be done solo or through collaborative design review, even with distributed teams. Products can be tested for ergonomics, manufacturability and serviceability early on in the development process with virtual mannequins. In-field engineers can be trained on products before they even exist.

VR can also be a powerful communication tool, allowing those from non-technical backgrounds, such as customers and clients, to better understand how a product will work and the actual size it will be. This can also offer huge benefits for marketing and sales.

VR is very graphics-intensive and requires a powerful GPU to deliver the 90 frames per second needed for a smooth VR experience. The AMD Radeon™ Pro WX 9100 is a good choice for professional workflows as it is certified for SOLIDWORKS® and delivers great 3D performance in game engine VR tools like Unreal®.

▲ Power to manufacturers



BluePrint Automation (BPA) designs and manufactures machinery for packing and palletizing products such as frozen foods.

Building prototypes of these large and complex machines for its customers to test can be a painstaking process. Visualizing and evaluating designs on 2D displays also has its limitations, as BPA's VP of engineering Chung-Chee Tai explains. "Last year, we had a customer come look at one of the machines, and they said, 'Wow, that's much bigger than I thought it would be!' That's when I thought that if we had VR, there wouldn't be surprises like that."

BPA implemented an AMD CAD-to-VR solution using the Radeon™ ProRender Game Engine Importer powered by an AMD Radeon™ Pro WX 9100 graphics card. Now, it is able to visualize the complex designs in VR, animating mechanisms, testing ergonomics; catching mistakes before assembling and manufacturing products. "It's good for safety analysis, too," adds BPA mechanical engineering clerk Katie Hildebrandt, "such as showing areas where it wouldn't be safe to put your hands."

BPA's next step for VR is back in the design studio, where its engineers are looking to use it to optimize key features, such as operability and serviceability, packing even more insight into the early design phase.

▲ Extending the reach of CAD into AR/VR

SOLIDWORKS® Extended Reality (XR), new for SOLIDWORKS® 2019, marks a big step forward for the use of Augmented Reality (AR) and Virtual Reality (VR) in product development.

The new XR Exporter allows users to export SOLIDWORKS® models so they can be read directly by third party AR, VR and web applications.

The XR file formats (.glTF and .glb) include more than just SOLIDWORKS® geometry, appearances and textures.

Animations, exploded views, display states, configurations and metadata can also be exported so users can re-play animations that were created inside SOLIDWORKS®, toggle through pre-defined display states, or trigger an exploded animation.

There are many potential use cases for SOLIDWORKS® XR beyond core design, including collaborative design review, marketing, sales and training.

SOLIDWORKS® already has several approved technology providers on board and is actively

recruiting others. Key applications include META Vision, for visualizing and interacting with 3D CAD models at 1:1 scale using the Meta 2 AR headset; Speedernet for creating web-optimized VR training experiences for smartphones; and HyperMock which extends the reach of CAD data into training, sales, marketing and in-field service via the cloud.

.glTF files can also be viewed in Microsoft® Office 365 products such as PowerPoint or used to create custom AR/VR experiences in game engines like Unity or Unreal®.

3 EASY PATHS FROM SOLIDWORKS® TO VR

Bringing CAD models into Virtual Reality (VR) has never been easier and SOLIDWORKS® users now have several options to experience designs in an immersive environment at a real-world scale.

▲ Radeon ProRender Game Engine Importer



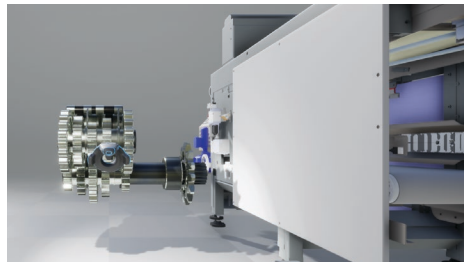
The AMD Radeon™ ProRender Game Engine Importer offers designers and engineers an easy path from SOLIDWORKS® into Unreal® Engine, via Radeon™ ProRender. Once inside Unreal® Engine, users can keep things simple or use the full power of the game engine (and their imagination) to create compelling interactive visualization or VR experiences.

The workflow is built around simplicity. Everything can be fed from the SOLIDWORKS® model – geometry, materials and lighting – so designers and engineers do not have to become experts in Unreal® Engine if they don't want to.

The SOLIDWORKS® part and assembly hierarchy is maintained throughout the process. It means individual parts and assemblies can be switched off or their mesh quality reduced to maintain adequate performance in VR.

The Radeon™ ProRender Game Engine Importer is available as a free plug-in for Unreal® Engine. AMD provides a step-by-step guide.

▲ Unreal® Studio



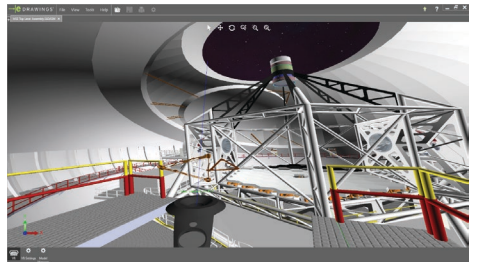
Unreal® Studio is a suite of tools and services from Epic Games which can help professional users bring 3D CAD data directly into the game engine for creating VR experiences.

The subscription service, which is currently in beta and free until September 2019, comprises three components: the Unreal® Engine Editor for creating real time and VR experiences, the Datasmith workflow toolkit for easier import of CAD data and a variety of learning resources.

For SOLIDWORKS® users, Datasmith is able to directly import and optimize part and assembly files, including basic color extraction, hierarchy and metadata. Any changes made in SOLIDWORKS® can be easily re-imported into Unreal® Engine without losing any changes that were made to the scene.

Unreal® Studio also comes with project templates, including a product viewer that can be used as starting point for a product visualization experience for desktop and VR.

▲ SOLIDWORKS® eDrawings Professional



eDrawings® Professional 2019 allows designers and engineers to take their SOLIDWORKS® designs into VR in just a few clicks. It can be used for quick design validation or collaborative design review.

In eDrawings®, simply open a SOLIDWORKS® assembly 'in VR', then choose an environment in which to place the model, such as a showroom, garage or factory, or pick a floor material.

With a fully immersive VR headset, users can teleport around, click on components to view metadata or move objects within the scene.

eDrawings® Professional currently works with the HTC VIVE, but there are plans to add support for other VR headsets.

The software is not limited to SOLIDWORKS® models. eDrawings® can also open a variety of CAD files directly, including PTC Creo®, Siemens Solid Edge®, CATIA®, Siemens NX™ as well as many neutral 3D formats. eDrawings® Publishers are also available for other CAD tools.

▲ Workstations for Virtual Reality (VR)

The AMD Radeon™ Pro WX 7100 is a good choice for entry-level VR, while the Radeon™ Pro WX 8200 and WX 9100 are better suited to more demanding VR workflows.

The Dell Precision™ 5820 (pictured right) and the **HP® Z4** (pictured far right) are ideal for professional VR content creation. These high-performance desktop workstations offer a range of high



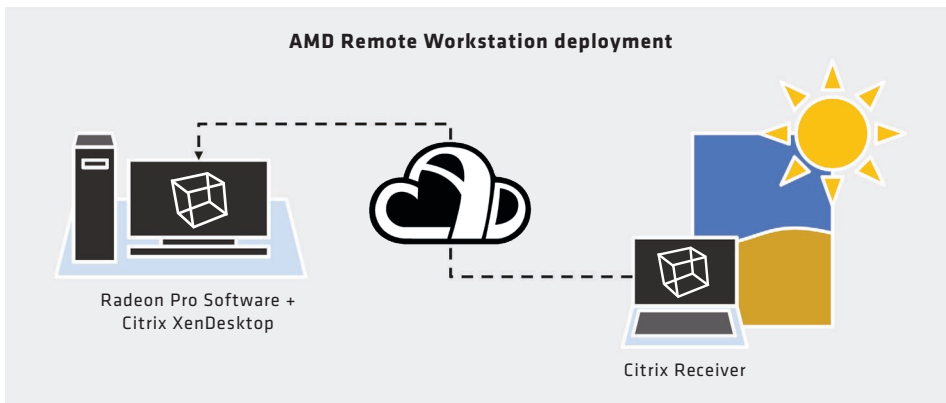
frequency CPUs, lots of memory for complex models and plenty of USB ports on the front and rear to plug in VR headsets and base stations / sensors.

They both support multiple high-end professional GPUs, including the Radeon™ Pro WX 7100 and WX 9100, although not all VR applications are able to make use of multiple GPUs.



USE SOLIDWORKS FROM ANYWHERE

Designers and engineers are no longer tied to their desks. AMD Remote Workstation gives the flexibility that modern product development demands.



Design or engineering is no longer the 9 to 5, Monday to Friday job it used to be. Global teams and increased time to market pressures mean 24/7 access to 3D CAD is becoming increasingly important. Designers and engineers never know when that moment of inspiration might strike or when a change order or approval will need an instant response.

There are many ways to connect to an office PC remotely, but a 3D CAD workstation presents a completely different challenge. SOLIDWORKS users need full 3D graphics acceleration and no lag when working with large assemblies.

AMD Remote Workstation offers an easy way for designers to access their physical workstation from almost anywhere, from almost any device and get the same workstation experience they

would expect to get in the design office.

AMD Remote Workstation works with any workstation with a Radeon™ Pro WX 4100, WX 5100, WX 7100, WX 8200 or WX 9100 GPU and the latest version of AMD Radeon Pro Software.

There are some additional requirements: Citrix® XenDesktop® Virtual Delivery Agent (VDA) needs to be installed on the workstation and Citrix Receiver on the client device, which could be a standard home PC, laptop or tablet.

The quality of the connection is also important, so to optimize for high-latency environments, AMD Remote Workstation allows the Citrix® VDA to securely access rendered frames directly from the AMD GPU's framebuffer, which cuts out a layer of latency observed with other remoting applications.

▲ 3D CAD in the cloud



A workstation does not have to be a physical machine that a designer or engineer can touch. It can also be virtual, housed in a local or cloud datacenter and accessed through a PC, laptop or tablet. It gives design and engineering firms total flexibility in how workstations are deployed.

With virtual workstations, all design data remains in the datacenter, protecting IP and helping ensure everyone is working off the latest revision. Resources are flexible, so designers can access different virtual machines (VM) on demand to complete the task at hand: for example, a VM with entry-level graphics when modelling parts and assemblies in SOLIDWORKS, and a VM with higher-end graphics when ray trace rendering.

The AMD Radeon™ Pro V340 datacenter GPU can offer this flexibility and deliver an impressively smooth graphics experience from the cloud to virtually any device, anywhere. It is enabled through unique AMD MxGPU technology: a hardware-based virtualization solution for fast, stable and predictable performance with the industry's highest user density¹, without requiring recurring end-user license fees.

¹The AMD Radeon™ Pro V340 graphics card supports up to 32 virtual users with 1GB memory profiles per card. The NVIDIA Tesla P40 supports up to 24 virtual users with 1GB memory profiles per card. AMD user density advantage 32/24 = up to 33% greater. NVIDIA Source: <https://images.nvidia.com/content/pdf/grid/data-sheet/nvidia-p40-datasheet.pdf>

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