Pfeiffer Report

Adobe Substance 3D:
Harnessing the Power of Virtual Photography

About this Research Project

This report presents the findings of a market-specific technology analysis and benchmarking project conducted by Pfeiffer Consulting for Adobe. The main aim of the research was **to assess the productivity and creative potential of virtual studio photography using the Adobe Adobe Substance 3D suite of products**, and to compare the efficiency of virtual photography with actual studio conditions.

Benchmarks were executed using *Pfeiffer Consulting's Methodology for Productivity Benchmarking*, which has been fine-tuned over more than a decade, and measures the time experienced operators take to execute specific tasks. Please refer to the Methodology section on the last page of this document for more information.

About Adobe Substance 3D

Substance3D is a powerful, integrated suite of 3D content creation applications geared towards extremely sophisticated materials creation and rendering. It also includes **an extensive library of curated assets** that are used in 3D-powered pipelines in industries such as AAA game design, product design & VFX. This research looks at a different domain where Adobe Substance 3D can provide considerable productivity as well as creative potential: Virtual studio photography. This research illustrates how **creative professionals in multiple design disciplines in marketing and image production can get up to speed with Adobe Substance 3D tools, and rapidly produce professional results**, without having to learn complex 3D software.

Executive Summary

▶ Adobe Substance 3D is a suite of tools and assets **providing extensive material creation and staging capabilities** for imaging, marketing, ecommerce and manufacturing professionals.

▶ This report analyzes **the advantages of using Adobe Substance 3D Stager as a virtual photostudio** and explores ways for designers to quickly create high quality content.

▶ Benchmarks for this research show that **virtual photography can provide very significant productivity gains** for many use cases, including product shots.

▶ Creating a product shot using Adobe Substance 3D Stager and Substance materials **took just over 20 minutes**, compared to **over three hours in a studio set-up.** (See page 4.)

▶ The Adobe Substance 3D Assets website **provides over 13,000 materials, 3D models and Studio Lighting Environments**, and helps professionals quickly **find the right asset for a job, as well as inspiration** for making the most out of Adobe Substance 3D.

Getting Quick Results:
The Power of Virtual Compositing

The Easy Way to Virtual Photography

3D software has a well-deserved reputation of requiring a steep learning curve – usually something creative professionals are wary of. Substance Stager changes that – and **offers a way of exploring virtual photography that does not require learning complex concepts** about lighting and rendering, and **can produce professional results in minutes**.

The bottom image **was created in just over 5 minutes**, and required no technical knowledge whatsoever. All that was necessary was to import the model of the handbag from the Adobe Substance 3D asset library*, to apply the textures – a simple drag-and-drop procedure – and to select the background image.

The Power of Image Matching

Stager offers a very powerful feature called **Match Image**. In this AI-driven process, the software **automatically analyzes the perspective of a background images,** adjusts the size and positioning of the 3D scene as well as lighting parameters in order to **create a rendering that composits the 2D background and the 3D model in a very realistic way**. Achieving a result with a comparable level of realism would take considerable time and knowledge in traditional 3D modeling applications. In other words, **combining a photographic backdrop with 3D models is by far the fastest way to get started in virtual photography**.

* While the Adobe Substance 3D asset library is a great way to get comfortable with the program, Stager can also use 3D models from most 3D applications and repositories.

Key Advantages

▷ Virtual photography can **produce professional results in minutes**.

▷ Adobe Substance 3D Stager's Match Image functionality **instantly combines a 3D model with a 2D photograph**, by matching the virtual object with the perspective of the background image, and **automatically creating the right camera position, lighting setup and shadows.**

▷ Creating the image on the right **took just over five minutes,** including importing the model, applying and adjusting textures and producing the final rendering.

Top left: The way the model of the handbag looks just after it is imported into Stager. Applying and fine-tuning the textures to the model took just a minute an a half.

Top right: The background image.

Bottom image: The final rendered image. Positioning of the 3D model, as well as lighting was done automatically – there was no need to fine-tune or modify any settings to achieve a photorealistic result, including realistic drop shadows and depth of field.

The time necessary to produce and render this image was five minutes and six seconds.

5 min. 6 sec.

The Speed of Iteration:
Virtual Photography for Merchandising

Speeding Up Image Production for Merchandising

Merchandising is one of the areas where virtual photography can result in very significant productivity gains. The reason for this is speed of iteration. In studio photography, experimenting with different materials, colors, fabrics, or the position of a logo on an item of clothing each require for these items to be individually produced, set up, and photographed. Even if these variations have already been produced, **every single one needs to be individually set up, arranged and photographed**, paying careful attention that the setup is identical in all shots.

In a virtual photography set-up, these changes can be achieved in minutes – while all the lighting and rendering settings remain unchanged. Even **experimenting with different backgrounds and lighting set-ups can be done in seconds**. (Top images.)

There are more extreme cases. Imagine you have to launch a line of products where a logo is to be embroidered on a garment, but there is a need to produce variations of fabrics and sizes. Without virtual photography, this requires for every individual item to be actually produced, shipped, and then photographed. **Adobe Substance 3D Sampler, on the other hand, can import the vector illustration of the logo, and transform it in seconds into virtual embroidery**. (Bottom images)

Merchandising imagery is clearly one of the simplest ways of approaching the power of virtual photography, producing professional results without requiring expert knowledge.

Key Advantages

▷ Producing images for merchandising can be time-consuming and costly. **Adobe Substance 3D Stager can reduce the time necessary for iterations to minutes.**

▷ Experimenting with different materials, backgrounds and lighting set-ups **can be achieved with a few clicks.**

▷ Adobe Substance 3D Sampler can not only **easily transform scanned or photographed textures into realistic materials**, it can also create **realistic-looking embroidery, weaving and stitching from line art** such as corporate logos.

Top images: Creating completely different iterations of the same items, including changing background and materials, as well as changing the position of the logo on the cap can be done in minutes: Creating the initial shot took under twelve minutes, including rendering; changing all the textures, the background and lighting, as well as rendering the second image took less than nine minutes

Bottom images: Using Substance 3D Sampler, line art for a logo can be transformed into realistic-looking embroidery with a few clicks.

The complete process, including exporting the logo from Illustrator, creating the embroidery in Sampler, texturing the model in Painter and rendering the final image took just over 16 minutes. Creating the alternate version took only 11 minutes, rendering included.

11 min. 48 sec.

8 min. 41 sec.

16 min. 25 sec.

11 min. 29 sec.

Images Clément Fuzier
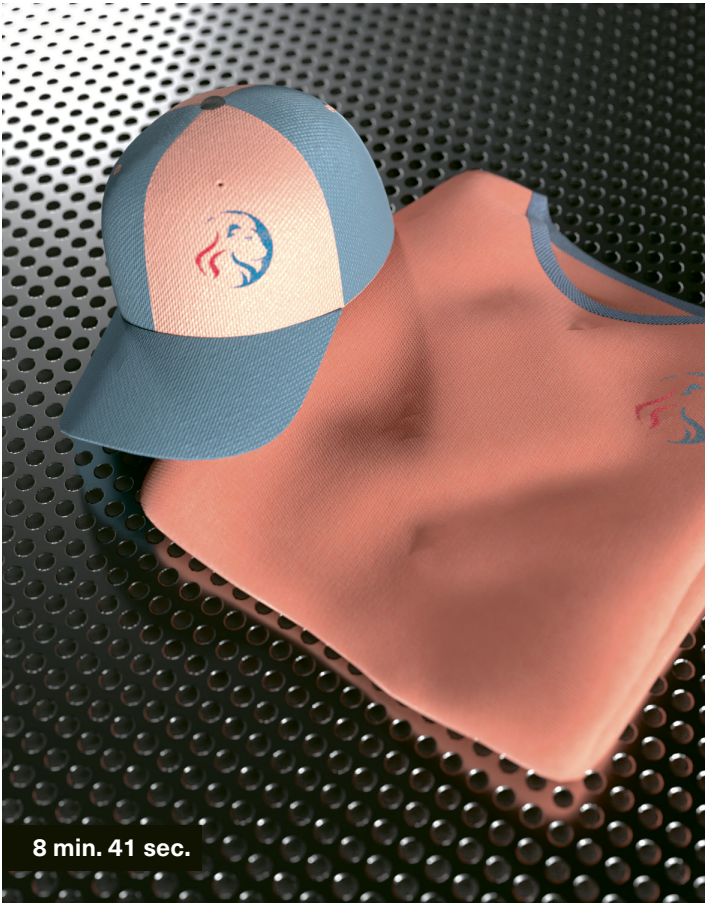
Reality Check: How Virtual Photography Compares to Working in a Studio

The Nitty-Gritty of Studio Photography

It's no secret that **studio photography is complex** and involves a number of constraints – above and beyond the expertise required to produce professional shots. For our real-world comparison, we chose a comparatively simple project, starting with a sketch of the desired shot, as well as one for an alternative arrangement, working with a professional photographer with years of experience in product photography.

Nevertheless, getting the right lighting set-up together, adjusting the background and arranging the scene until it was just right **took well over three hours**, including the time to source the decorative elements, setting up lighting, and camera position, and experimenting with different lighting settings. Also included was the time necessary to develop the raw images in Photoshop, and to position the branding created in Illustrator.

The Productivity Advantages of Virtual Photography

While virtual photography does not aim to replace every kind of studio work, for product photography it is clearly much faster, and can produce images that are indistinguishable from traditional photographs. **Sourcing decorative elements to set up a scene, can be done on-line in a few minutes**. (All elements used in this picture were downloaded from the Adobe Substance 3D Assets website, including the proper studio-lighting setup.)

All in all, **producing the image on the right took just over 20 minutes** – including searching and downloading the models and lighting setup, arranging and fine-tuning scene and lighting in Stager, and rendering the final image. **Creating an iteration of the shot using a different arrangement took just over ten minutes.**

Key Advantages

▷ Adobe Substance 3D Stager can create **professional-level product photography in a fraction of the time** necessary for a studio shot.

▷ Sourcing 3D models and materials **can be achieved in minutes using the Adobe Substance 3D Assets website.**

▷ Stager offers a wide variety of professional studio-lighting presets that **make experimenting with different lighting styles extremely fast**.

Photo François Delebecque

Studio Shot: 3 hours. 12 min.

Studio Shot Iteration: 46 min.

Top Image: Studio Shot. The shot produced by a professional photographer in a photo studio. The towels and the wooden board needed to be sourced for the shot. Basic installation of the lighting set-up took an hour; trying out different camera angles, arrangements of the flasks and towels as well as lighting positions took almost as long, since it required physically moving and adjusting lights and camera several times. Creating the alternate shot was somewhat faster, since everything was more or less in place. The branding was added in post-production.

Bottom Image: Virtual Shot. Finding and downloading the 3D models and the material for the towels and setting up the basic scene in Stager took under seven minutes. Fine-tuning the arrangement of objects, textures and lighting, and preparing the scene for rendering was achieved in just under eleven minutes, while rendering the final image added about five minutes. The overall time for creating this image was 22 minutes and 38 seconds. Creating an alternate version took just over ten minutes, including rendering.

Virtual Shot: 22 min. 38 sec.

Virtual Shot Iteration: 10 min. 37 sec.

Accessing the Full Potential:
Exploring the Power of Substance Tools

The Power of the Adobe Substance 3D Suite of Tools

There is no doubt that **Stager is the easiest way for producing professional results using virtual photography**: it is easy to learn and master, and does not require any prior knowledge of 3D software. However, to access the full potential of Adobe Substance 3D, **it is worth diving into the other software components of the suite – especially Adobe Substance 3D Sampler and Painter.**

Sampler is ideal if one needs to transform textures captured in the real world and to transform them into realistic-looking materials that can be used in Stager or other 3D applications. (And it can even create realistic embroidery based on vector art, as you can see on page 3.) But if one **needs to do detailed and complex texturing of a hero object, Adobe Substance 3D Painter is the way to go**, especially since it is tightly integrated with Stager.

What Adobe Substance 3D Painter Brings to the Table

As the name suggests, Painter lets you paint on 3D objects, using a layer architecture that's very familiar to Photoshop users – but it can do much more. While Stager can use one material at a time for an object or a component of a complex model, **Painter can layer different materials in very powerful ways**, and displays in real time how these multiple aspects will be rendered.

Once texturing is completed, **the fully textured model can be sent directly to Stager to be showcased in the appropriate scene.** Of course, **Painter can use the thousands of highly realistic materials and assets available on the Adobe Substance 3D Assets website**. More on this subject on the following page.

Key Advantages

▷ Adobe Substance 3D Painter and Sampler are **the best way to access the full power of Substance materials.**

▷ Painter is tightly integrated with Stager. **As soon as the hero asset for a shot is textured, it can be sent directly to Stager** to be rendered as part of a complex scene.

▷ Stager offers **dozens of different lighting configurations** for realistic scenes and shadows. In addition, **several staging environments, complete with different camera and lighting configurations are available**, making professional product shots very quick and easy.

Top Image: The model of the headphones as shown in Painter. The program provides real-time realistic rendering throughout the texturing process; in this image the textures are already applied. The model can now be sent to Stager to create the final scene.

Bottom Image: The textured headphones in Stager. Here, one of several studio environments available in Stager has been used. It provides the background, precisely positioned lights and camera set-up in order to produce a professional product shot with minimum effort.
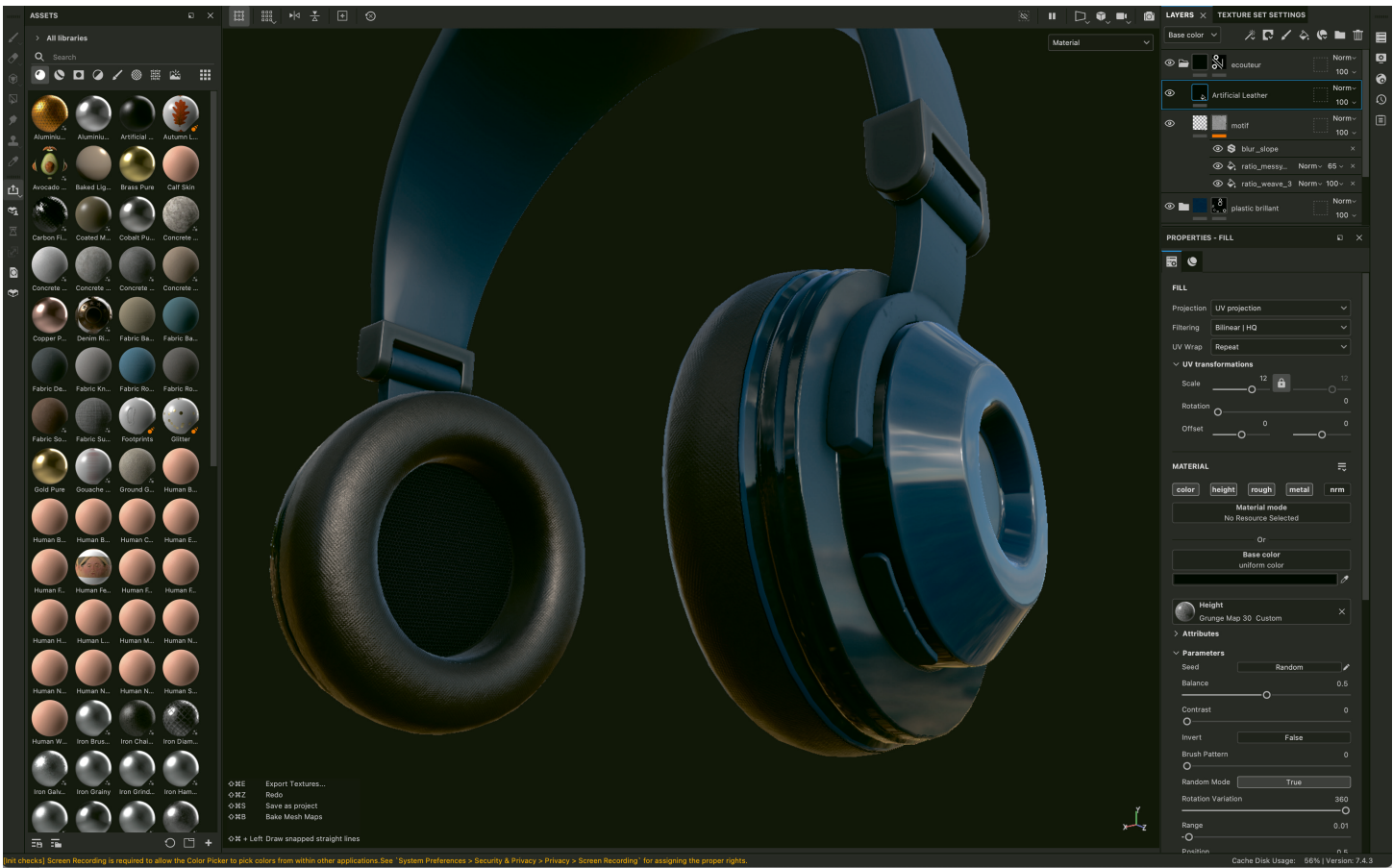
The Asset Library:
An Essential Part of Adobe Substance 3D

What's in a Material?

The word 'asset library' does not fully convey the depth and power of the Adobe Substance 3D Assets website, an essential part of the Adobe Substance 3D suite of tools. **The website gives access to a constantly growing library – current count 13,867 –** of all kinds of assets: **materials, parametric textures** (that can, for instance, build a three-dimensional façade without any modeling), as well as **thousands of 3D models**, atlases, decals, and **lighting environments**. In addition, the website **offers collections built around specific themes, such as Food, Fashion, Interior Design**. This makes it easy to find the right asset for a specific job.

The Power of Displacement

One of the key aspects of Adobe Substance 3D materials is **the extensive use of what in 3D jargon is called 'displacement mapping'.** In layman's terms this means that **a material can not only affect the surface appearance – project an image onto an object – but actually** *transform* **the** *3D volume*. Thus, a few simple 3D primitives can create extremely complex objects in the rendered scene – without requiring any modeling.

In any case, no analysis of Adobe Substance 3D would be complete without giving credit to **the creative potential – and also inspiration – that the Adobe Substance 3D Assets website can provide.**

Key Advantages

▷ The Adobe Substance 3D Assets website **is an essential part of the Adobe Substance 3D suite,** and offers thousands of textures and models.

▷ Asset collections targeting specific market segments make it easier to **rapidly find the right assets for a given job**.

▷ **Displacement mapping provides realistic volumetric textures** that can create very complex objects using simple 3D primitives.
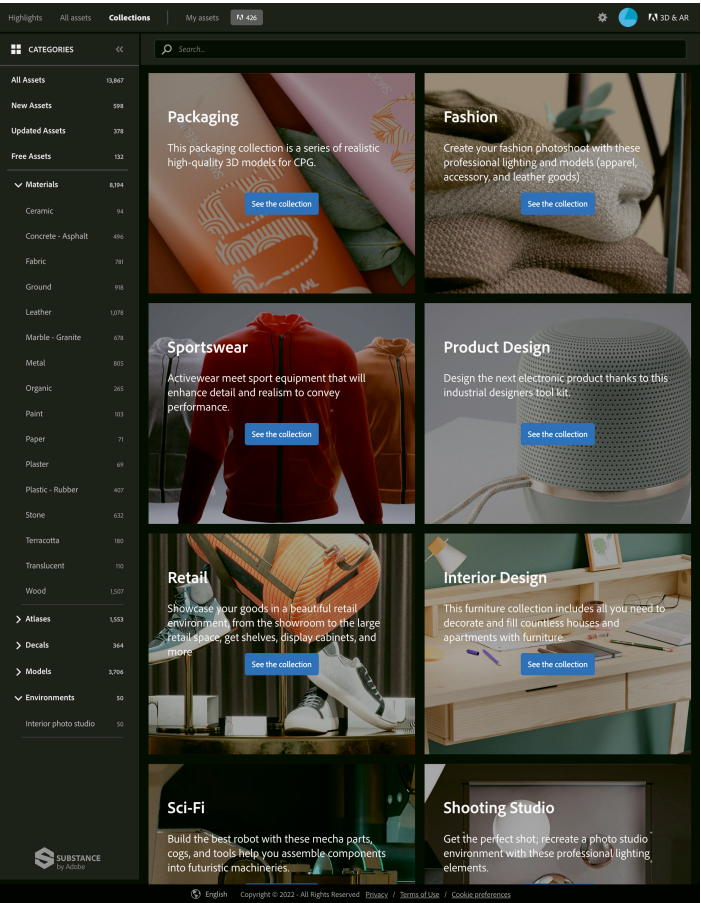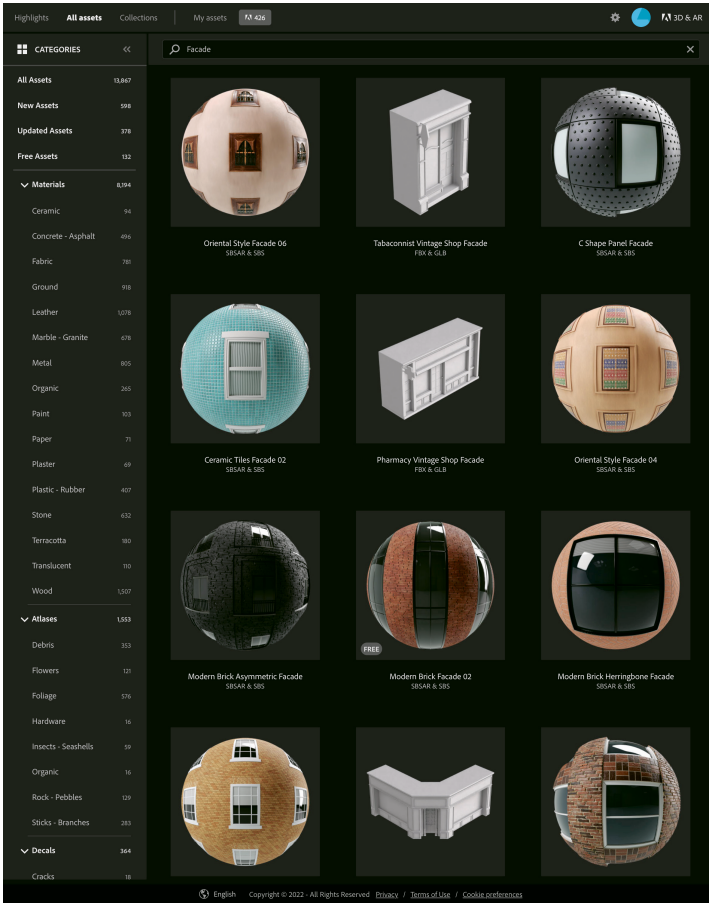
Top: The Adobe Substance 3D Assets website currently offers over 13,000 assets, including parametric materials, 3D models as well as lighting environments (Left image.)

Collections targeting specific market segments make it easier to find the assets for a specific job. (Right image.)

Bottom: Adobe Substance 3D makes extensive use of displacement mapping that creates realistic volumetric surfaces using simple shapes.

Left image: A capsule rendered with the 'Quartzile Rock' material.

Right image: a cube rendered with the 'Japanese Roof Tiles' texture.

Methodology

This benchmark project was commissioned by Adobe and independently executed by Pfeiffer Consulting.

All the productivity measures presented in this document are based on real-world workflow examples, designed and executed by professionals with many years of experience with the programs and workflows involved.

How we design the benchmarks

The basic approach is simple: in order to assess productivity gains that a program or solution may (or may not) bring, we start by analyzing the minimum number of steps necessary to achieve a given result in each of the applications or workflows that have to be compared.

Once this list of actions has been clearly established, we start to execute the operation or workflow in each solution, with the help of seasoned professionals who have long-standing experience in the field and with the solutions that are tested.

Every set of steps is executed three times, the average of the three measures is used.

About Pfeiffer Consulting

Pfeiffer Consulting is an independent technology research institute and benchmarking operation focused on the needs of publishing, digital content production, and new media professionals.

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