

General Information: What process does Strata Live 3D use to create 3D models?

Strata Live 3D actually uses several processes to create 3D models, depending on customer requirements. In broad terms, we have three modeling processes:

- Strata Live 3D Photographic Process
- Strata Live 3D Artisan Process
- Strata Live 3D Industrial Process

Each of these processes has the same basic output — a 3D geometric representation of a product suitable for use on the Web in our interactive 3D [viewer](#), and in a variety of other applications, such as PDF, Video, and Flash. This article explains each of these processes at a high level, and ends with a comparison chart showing the relative strengths of each approach.

/ The Strata Live 3D Photographic Process

As far as we know, Strata Live 3D is the only company using a completely photographic process to create 3D models for product visualization, although techniques similar to Strata Live 3D's are sometimes used in the visual effects industry to augment high-budget live-action movies. Part of the reason for this advantage is the web viewing technology Strata Live 3D has developed. No other web viewing technology supports the high-resolution and innovative compression that Strata Live 3D's software provides. The specific tools and techniques Strata Live 3D uses are proprietary, but the overall flow works like this:

1. Photo Shoot

The product to be modeled is photographed using high-resolution, professional digital cameras. This shoot is done by a professional photographer, using professional studio lighting and equipment. Several photos are taken of each part of the product, typically taking about 2 hours per part. Strata Live 3D works exclusively with contract photographers trained in the exact requirements of a Strata Live 3D photo shoot. The end results of this shoot are several hundred megabytes of studio-quality digital images of the product (which will, during this process, be compressed down a few hundred kilobytes for web viewing).

2. Modeling

These digital photographs go to a 3D artist, along with various measurements also taken during the photo shoot, and, ideally, the actual product for measurement of particular features and to aid in creating accurate range-of-motion for moving parts. The artist creates a 3D representation of the exact shape of the object, using the photos as a reference, and applies those same photos as surface color and texture. Proprietary tools are used to eliminate any visible seams between the photos. The end result is an extremely accurate 3D model of the product, fully textured, with range-of-motion information for all moving parts. These "Master Models" are typically about a hundred megabytes, including texture and geometry. Very large or complex products may be several times that large.

3. Compression

This high-resolution Master Model is then assigned compression parameters for use in Web applications. Models typically have 60 to 100 individual textures derived from original photographs. These are automatically cropped, so only the specific pixels mapped to the model are actually included, and then they are grouped into a dozen or so "composite image" texture maps which will

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be used on the interactive 3D model. Compression settings are selected for each texture, analogous to the "Save for Web" feature in Photoshop. However, instead of choosing between JPEG and GIF, the textures will be compressed with either a wavelet-based or a wide-palette-based proprietary compression algorithm, as well as optionally scaled, noise-reduced, sharpened, etc. The specific compression parameters to use are estimated automatically by Strata Live 3D software, and then a technician may individually adjust the settings as needed. In addition, regions-of-interest such as logos and small text are identified, where more clarity is required in the final model.

4. Quality Assurance

Quality assurance actually takes place continuously during the process, but there is an explicit sign-off required after compression, to ensure the technician's choices match customer requirements accurately.

5. Animation

While the 3D artist was responsible for specifying the range-of-motion of each part, the specific animation sequences which are required for an application have not been implemented at this point. Using Strata Live 3D software, a project manager working closely with the customer, will create the specific animation sequences needed. These include moving and fading parts of the model, moving the view-point around, and specifying interrelationships between animations (for example, "the power must be switched off *before* removing this circuit board").

// The Strata Live 3D Artisan Process

The Artisan Process is suitable for applications where higher numbers of 3D models are required in a shorter period of time. This process does not rely on specialized photography. Instead, any information available about the products will be leveraged, such as existing marketing collateral, web site images, spec sheets, 2D CAD data, or 3D CAD data. This process has fewer steps than the Photographic Process described above, and involves a lot less data (typically hundreds of kilobytes, rather than hundreds of megabytes):

1. Modeling

The 3D artist is provided with whatever source data is available, and they create a 3D model which matches that data as well as possible. Obvious hierarchical relationships between objects are specified at this point, although the specific range of motion will typically not be included. If necessary, a few photographs will be used as texture, for example, to show a logo or a control panel. Other surface characteristics, such as color and reflectivity, are specified as well.

2. Compression & QA

Since these models use little or no texture, automated compression algorithms generally do a fine job, but in some cases a technician may need to perform minor adjustments of the settings.

3. Animation

Source data rarely describes range-of-motion accurately, so for models which include motion, the project manager will typically work with the customer at this point to determine what the product range-of-motion is and will add that to the Master Model. As with the Photographic Process, customer-specific animations are also created at this point.

/// The Strata Live 3D Industrial Process(es)

For very large product catalogs, and for certain kinds of objects, Strata Live 3D can use Industrial

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Processes to create large numbers of models at a much lower price point. There are several processes available, but the two which are most generally applicable are batch CAD conversion, and silhouette-based shape capture.

In cases where the customer has a library of 3D solid-model CAD data, Strata Live 3D may be able to automatically batch convert this data into useful web models. This includes not only converting the raw data format from proprietary CAD formats, but also applying appropriate surface texture, and decimating and compressing the data to make it useful on the web. Not all data is suitable for this kind of automated processing, in which case the CAD data could instead be used as an input to the Artisan Process described above.

A closely-related case to the CAD conversion one is where the customer has a library of web 3D models in an obsolete format. In some cases, Strata Live 3D may be able to batch-convert this old 3D content for use in modern web browsers.

The other main industrial process Strata Live 3D uses is a nearly automatic silhouette-based capture process. Each product to be modeled is placed on a turntable, and a set of calibrated photographs are taken from many angles. Complex software analyzes these photographs, and automatically determines the 3D shape of the object. It then creates a 3D geometry, and uses the photographs as texture. Because this process is highly automatic, it cannot approach the quality of the Strata Live 3D Photographic Process. However, for many classes of objects, it produces acceptable 3D models at a lower cost per object.

Comparison of the Processes

Photographic Process

Artisan Process

Industrial Process

Typical Examples

Consumer Electronics
Networking Equipment

Lighting

Furniture

Medical Supplies

Auto Parts

Collectables

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High-Resolution Zoom

Yes

Limited

No

Animated Parts

Yes

Yes

No

Animated Views

Yes

Yes

Yes

Guided Tours

Yes

Yes

Yes

Swap Fabrics

No

Yes

No

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Swap Wood-grain

No

Yes

No

Change Colors (curves)

Yes

Yes

No

Web-Enabled

Yes

Yes

Yes

PDF-Enabled

Yes

Yes

Yes

Suitable for Video Production

Yes

Some Applications

No

General Information: What process does Strata Live 3D use to create 3D models?

Suitable for Still Capture

Yes

Some Applications

No

Dimensional Accuracy

Exact

Depends on Source Data,
typically > 90% accurate

Approximate for image-derived
Exact for CAD-derived

Input Requirements

Physical Product
(or we can train your professional studio photographer)

One or more of:
- Marketing Pictures
- Spec Sheets
- CAD Data

Either:
- Physical Product
- CAD Data

Applicability

Anything which can be shot in a photo studio

Everything

Image-derived processes can model most small objects,
CAD-conversion processes depend on nature of source data

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Pricing

Depends primarily on number of moving parts, varies by product

Fixed price per product, depending on volume of products modeled

Fixed price per product, depending on process to be used and volume

Turnaround Time

2 Weeks (typical)

48 Hours (minimum)

24 Hours (minimum)

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