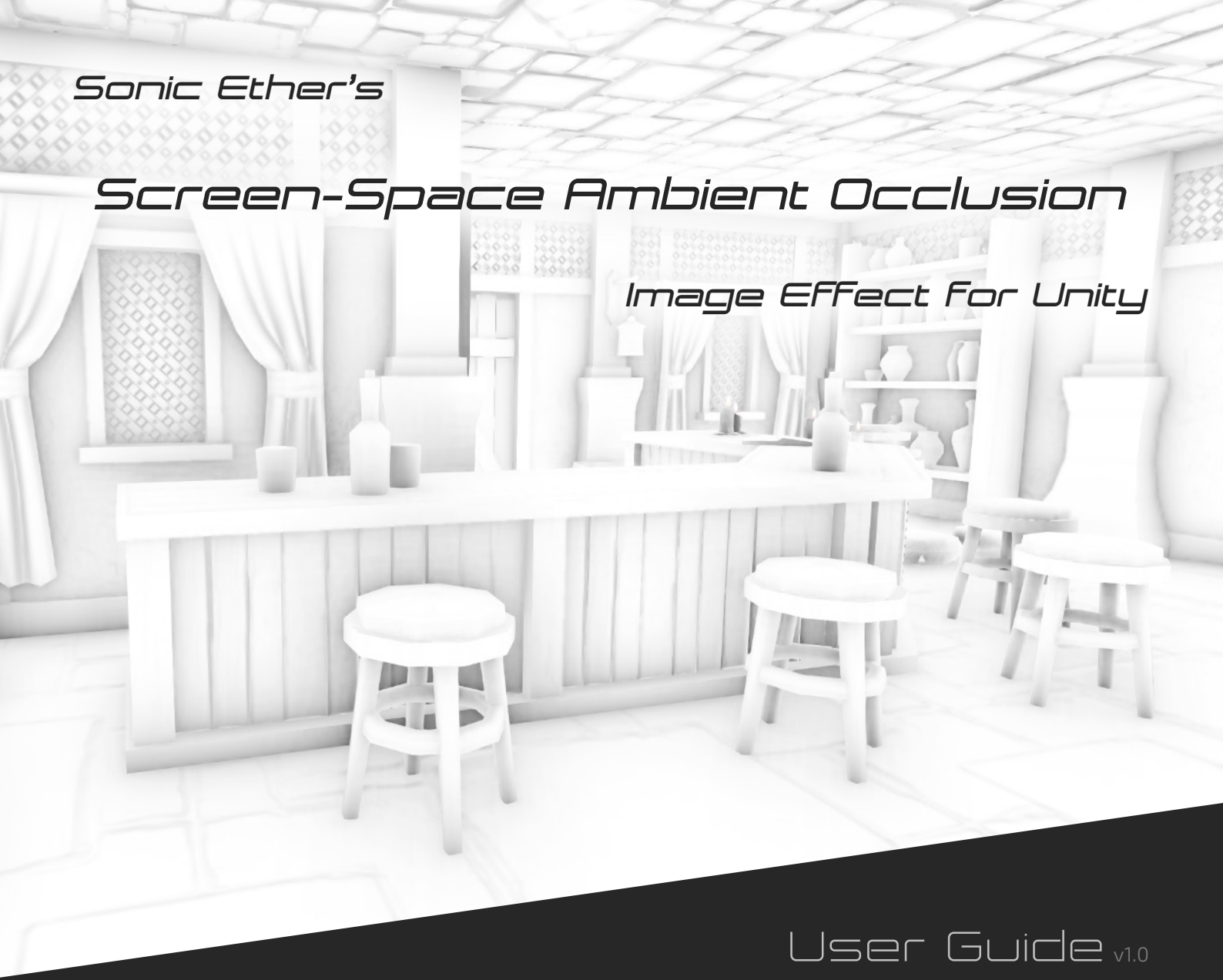


Sonic Ether's

Screen-Space Ambient Occlusion

Image Effect For Unity

User Guide v1.0

1. Introduction

Thank you for purchasing SESSAO for Unity! You now have access to a unique high-quality solution for Screen-Space Ambient Occlusion that, when used properly, can greatly improve depth perception and quality of lighting in your game.

1.1 Summary

SESSAO is an image effect that approximates soft contact shadows to bring a lighting phenomenon seen in the real world to your scenes. Not only is it algorithmically unique and flexible, it includes a "color bleeding" feature not seen in other SSAO solutions that can further improve the quality of your scenes. Its quality to performance cost ratio is much better than built-in Unity SSAO and many other SSAO algorithms.

1.2 Compatibility

SESSAO works with Unity 4 and 5 and supports forward and deferred rendering paths for any non-mobile platform. SESSAO is plug-and-play; simply add the script to your main camera before other image effects and see immediate image-quality improvements! It is also compatible with any custom shaders (Alloy, for example).

2. Usage Guide

This section will help you to setup SESSAO in your Unity game and will provide tips for implementation so that your game can make the most out of this image effect.

2.1 Adding the Effect to Your Game

Follow these steps to get SESSAO up and running in your project!

Step 1: Set Color Space to Linear

Calculating lighting in gamma-space is probably one of the most crucial mistakes visually a game can make. Make sure that your game's lighting isn't in gamma-space!

1. From the Menu Bar, go to Edit > Project Settings > Player

2. In the Inspector, select the icon respective to whether your game will be played using the Unity Web Player, or the Standalone Player

3. Under Other Settings, select the Color Space dropdown and select Linear.

Step 2: Add SESSAO Component to Your Main Camera

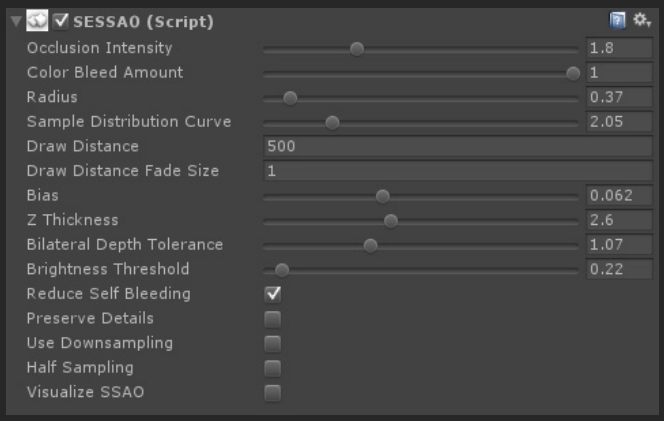
1. Select your main camera in the Hierarchy, and from the inspector, click the Add Component button.

2. In the drop-down menu, select Image Effects > Sonic Ether > SESSAO

3. If you already have other image effects added to your main camera, ensure that SESSAO is before any image effects like bloom, fog, tonemapping, or screen-space reflections. It should be one of the first effects on your camera.

2.2 Adjusting SESSAO's Parameters

This section will provide descriptions of each adjustable parameter in this image effect.



Occlusion Intensity: This parameter adjusts the overall intensity of the ambient occlusion. Higher values will result in darker contact shadows. Keep in mind that having SSAO that is too intense can worsen image quality.

Color Bleed Amount: This parameter adjusts the amount of nearby surface color bleeding applied to the resulting contact shadows. Color bleeding slightly increases the performance cost of this image effect. Setting this to 0 will disable color bleeding entirely and improve performance.

Radius: This parameter adjusts the lookup radius for finding nearby occluding surfaces. Higher values result in larger and smoother contact shadows. Lower values result in smaller and sharper contact shadows. This value has a proportional impact on performance cost. Want to have sharper contact shadows as well as large smooth shadows? Check out the "Sample Distribution Curve" parameter below.

Sample Distribution Curve: This parameter adjusts the distribution of samples such that higher values cause AO samples to "bunch up" closer to the receiving surface. Increasing this value can improve close-proximity contact shadows and reduce artifacts seen when using a large radius value.

Draw Distance: This value determines how far in world space units from the camera SSAO should be drawn. If you're having problems with distant objects casting strange AO, decrease this value.

Draw Distance Fade Size: This parameter affects how suddenly or gradually SSAO will fade out as object distance approaches the Draw Distance value. Larger values mean that AO begins fading out sooner as distance increases. For example, if this value is set to 50 and Draw Distance is set to 200, AO wil begin fading out at 150 units and be completely gone at 200 units.

Bias: This parameter adjusts the angle width relative to the surface normal in which occlusion samples are accepted and used in shading. Negative values will cause self-occlusion artifacts (sometimes a useful artistic effect that causes convex corners to be highlighted). Use a value of 0 to use all physically-accurate angles of samples during occlusion lookup. Values above 0 cause a narrowing of accepted occlusion samples, which can help reduce artifacts that arise when a surface's normals do not closely match the geometry normals (sometimes seen in low-poly models and models that use normal maps heavily).

Z Thickness: This parameter affects how deep in the z-axis ambient occlusion shadows are allowed to extend onto surfaces behind the caster. Increase this value to improve the shadowing of thick objects, while risking dark haloing behind thinner objects. Decrease this value to prevent excessive haloing behind thin occluders.

Bilateral Depth Tolerance: SESSAO uses structured stochastic sampling to optimize the process of looking for nearby occluders. If this value is too low, you will see structured noise artifacts on oblique geometry angles (sometimes seen as lines or a dither-like pattern). If this value is too high, nearby objects will not be as clearly defined and shadows will tend to blend across surfaces that are separate but nearby each other in the depth buffer. Find the sweet spot for this setting in your scene by observing surface shadow definition and looking out for structured noise artifacts.

Brightness Threshold: This parameter affects how much the brightness of a pixel reduces intensity of shadowing. Increase this value to reduce shadowing on brighter objects in your scene.

Reduce Self Bleeding: Enabling this parameter will reduce bleeding shared between surfaces of similar color when using color bleeding. Sometimes color bleeding can cause unwanted overly-saturated shadows when the shadow casting surface is the same color as the receiving surface. Enabling this parameter reduces this artifact.

Preserve Details: Enabling this parameter will yield finer details in areas of geometric complexity/discontinuity in exchange for more apparent discretization (banding) artifacts. If your game is being rendered at a resolution lower than 1080p, enabling this parameter can help the clarity of ambient occlusion. Because the number of samples taken decreases to compensate for the cost of higher spatial precision, performance costs remains the same regardless of whether this parameter is enabled or not.

Use Downsampling: Enabling this parameter causes SSAO to be calculated at half-resolution. Enable this parameter to reduce performance cost of this image effect.

Half Sampling: Enabling this parameter halves the amount of samples that are taken to determine shadowing. Enable this parameter to reduce performance cost of this image effect.

Visualize SSAO: Enabling this parameter will allow you to visualize the SSAO buffer directly before it's blended with your scene. Looking at the Game view with this parameter enabled, you will see only the SSAO buffer.

3. Support

If you need support for this product, wish to provide suggestions, or want to report an issue, please email me (Cody Darr) at cody@sonicether.com and I'll be happy to assist you! Please also check out the official support thread here. There may already be a solution to your problem there!