S.P.A.C.E (Stellar Procedural Animated Custom Environment) Documentation

Overview

S.P.A.C.E is a fully customizable procedural space shader for Unity, VR compatible. It uses spherical directional coordinates to create dynamic and animated space environments, including stars, nebulas, planets, and subtle space debris.

Features

- **Dynamic Starfield**: Adjustable density and twinkle for far, mid, and near stars.
- **Procedural Nebulas**: Customizable color offsets and dynamic appearance.
- **Animated Sun**: Directional, size, and tint adjustments.
- **Planet with Atmosphere**: Fully customizable planet size, brightness, and atmosphere thickness.
- **Space Debris**: Subtle, animated space debris for added depth and motion (enabled through shader parameters).

Shader Variants

The **StarfieldSky** shader features several variants that are dynamically controlled through the **SkyMaterial** ScriptableObject. This allows you to mix and match different elements of the space environment, including the sun, planet, and space debris effects. The **SkyMaterial** object automatically adjusts the shader based on your selection, giving you a wide range of customizable space scenes.

Key options include:

- **Sun Effect**: Add a sun with adjustable direction, size, and tint.
- **Planet Effect**: Include a planet with customizable size, brightness, atmosphere, and tint.
- **Space Debris Effect**: Enable animated space debris for added motion and depth.

By controlling these options through the **SkyMaterial** object, you can create everything from a minimalist starfield to a fully detailed space scene with sun, planet, and space debris effects.

Getting Started

1. Installation

- Download the S.P.A.C.E asset from the Unity Asset Store.
- Import the package into your Unity project.

2. Applying the Shader

There are two ways to apply the shader:

Preferred Method:

- The shader is controlled via the **StarfieldMaterialManager** GameObject, located in the Demo Scene.
- The material created is automatically assigned and controlled by the **SkyMaterial** ScriptableObject. This approach is simpler and provides an intuitive interface for managing the shader's parameters.

Alternate Method:

- In this method, the material must be created manually.
- Create a new material, assign the **StarfieldSky** shader, and apply it to the Skybox Material field via the Unity Lighting/Environment window, as described in the original method.

3. Customization Options

Here's a breakdown of the key customizable shader parameters:

General Parameters::

- **Seed**: Randomizes the procedural generation (integer).
- **Gamma**: Controls the overall brightness adjustment of the sky. Lower values darken the sky, higher values brighten it.
- **Orientation**: Orientation of the sky material. This vector determines rotation applied to stars, planets, and other elements.

Starfield Parameters:

- **FarStarDens**: Controls the density of far stars (range: 0 to 1).
- **FarStarTwinkle**: Adjusts the twinkle effect of far stars (range: 0 to 1).
- **MidStarDens**: Controls the density of mid-range stars (range: 0 to 1).
- **MidStarTwinkle**: Adjusts the twinkle effect of mid-range stars (range: 0 to 1).
- **NearStarDens**: Controls the density of near stars (range: 0 to 1).

Nebula Parameters:

- **NebulaColOffset**: Changes the nebula color (color picker).

Sun Parameters:

- **SunSize**: Changes the size of the sun (range: 0 to 1).
- **SunDirection**: Direction vector for the sun's position in the sky (vector).

- **SunTint**: Adjusts the sun’s color tint (color picker).
- **SunCoronaSpeed**: Speed of the sun's corona effect, adding a dynamic glow around the sun (range 0 to 1).

Planet Parameters:

- **PlanetSize**: Adjusts the size of the planet (range: 0 to 1).
- **PlanetDirection:** Direction vector for the planet's position in the sky. (vector).
- **PlanetAngle**: Angle of the planet's axis. Adjust to tilt the planet. (range: 0 to 1).
- **PlanetSpeed**: Orbital rotation speed of the planet. (range: 0 to 1).
- **PlanetTint**: Adjusts the planet’s color (color picker).
- **PlanetAtmosphereTint**: Adjusts the planet’s atmosphere tint (color picker).
- **PlanetAtmosphereThickness**: Changes the thickness of the atmosphere (range: 0 to 1).
- **PlanetBrightness**: Controls the planet's brightness (range: 0 to 1).
- **ShadowAngle**: Angle of the shadow cast on the planet. (range: 0 to 1).
- **ShadowDepth**: Perpendicular angle of the shadow on the planet (range: 0 to 1).

Space Debris Parameters:

- **MeteorTint**: Adjusts the space debris color tint (color picker).
- **MeteorBrightness**: Higher values make debris more visible. (range: 0 to 1).
- **MeteorSpeed**: Speed of the space debris movement (range: 0 to 1).

Performance

- The shader is optimized for real-time performance, with smooth framerates on mid-range hardware.
- Tested performance: Approximately 400 fps on average PCs.
- **VR Compatible**: S.P.A.C.E is optimized for both standard and VR applications.

Tips for Best Results

- Adjust the **Seed** parameter to generate different variations of space scenes quickly.
- Experiment with the **NebulaColOffset** and **SunTint** to match the mood of your scene.
- The **Space Debris** effect works best when used subtly to avoid overwhelming the scene.

Support

For any issues, questions, or suggestions, contact us at **gamesoftcraft@gmail.com**.

License

This asset follows the standard Unity Asset Store license agreement. Refer to the Unity Asset Store for more details.