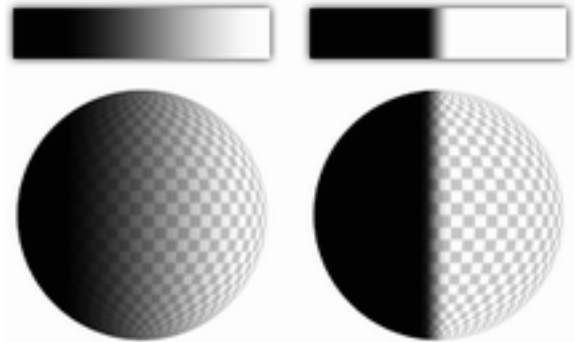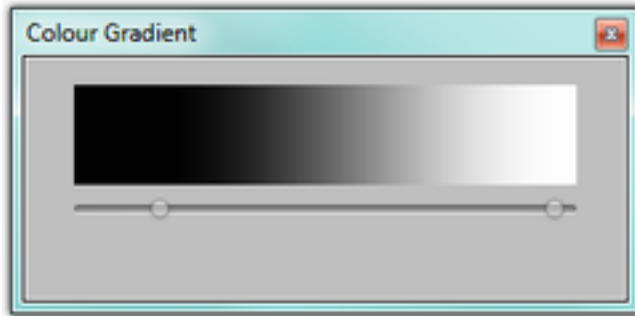# The Planet Component

Planet

Lighting

This field allows you to modify the lighting gradient applied to your planet. On the right you can see two example gradients and what they look like when applied to a planet. If you hit the Edit button, then you should see the gradient window as seen below.

The left side is how bright the dark side of your planet is, and the right side is how bright the light side of your planet is. The two small circles you can see on the slider bar are colour keys, if you click one then you can select it which will reveal the colour picker. You can also click and drag the colour keys to a different position on the gradient. To add a new colour key, just click on an empty part of the slider bar. To remove a colour key, just click and drag a key out of the window.

Light Source

If your scene already contains a light source, then this field will automatically be filled in. If not, then create an empty **GameObject** and attach the **Space Graphics Toolkit → Light Source** component.

Observer

If your scene contains a camera tagged with **MainCamera**, then this field will automatically be filled in. If not, then create one and either change its tag to **MainCamera**, or drag it into this field.

LUT Size

This allows you to change the resolution of the generated gradient textures. A higher resolution means the gradient will be more accurately represented, but it will require more GPU memory.

Note: You should set this as low as you can get away with. You probably won't ever need this to be above 256.
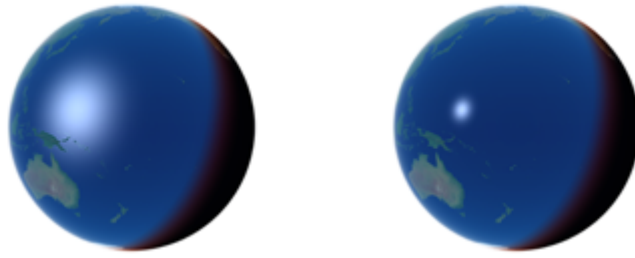
Surface

Radius

This changes the radius of your planet, but it won't change the scale of the **GameObject** your **Planet** component is attached to.

Specular Power

This changes the size of the specular reflection/highlight on your planet's surface. This field is only editable if you have set the **Surface → Texture → Specular** field.

Detail Repeat

This changes how many times the detail texture is repeated across your planet's surface. This field is only editable if you have set the **Surface → Texture → Detail** field.

Configuration

This allows you to change the mesh and texture configuration used by your star's surface.

● Sphere

A sphere configuration means your star's surface will be made from a single mesh of a sphere and a single set of textures.

● Cube

A cube configuration means your star's surface will be made from six meshes forming a cubed sphere, and each cube face will use a unique set of textures.

The main difference between these two options is that **Sphere** surfaces will suffer from polar distortion, whereas **Cube** surfaces are free from polar distortion. However, creating cube textures for planets may be more difficult and time consuming. The image below illustrates what polar distortion (left) looks like compared to cube mapping (right).
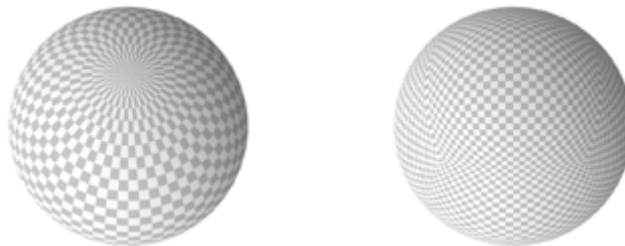
Mesh

You can open the select mesh window by pressing the ☉ button. Then depending on your **Surface → Configuration** search for either **'Surface Sphere'** or **'Surface Cube'**, and you'll see a list of suitable prepackaged meshes.

Note: The number at the end of the mesh name (e.g. Geosphere**40**) indicates how detailed the mesh is. You should try to set this as low as possible for faster rendering.

Note: If your **Surface → Configuration** is set to **Cube**, then make sure the mesh face (**+X. -X, +Y**, etc) matches the face you're currently setting.

Render Queue

This allows you to change the render queue used by the planet surface material. Consult the official Unity documentation if you're unsure what this means.

Collider

This option will create a mesh collider for your planet's surface, this is useful if you want things to collide with your planet, or you want camera lens flares to hide behind planets.

Note: Do not use this option if your planet is also using the **Space Graphics Toolkit → Surface Tessellator** component.

Material

This field allows you to set the physics material used by the planet's surface mesh collider.
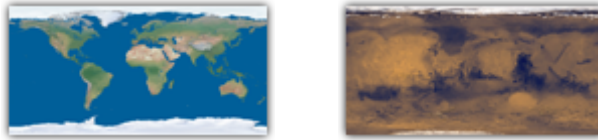
Note: This field is only visible if **Surface → Collider** is set.

Texture
Day
This allows you to set the texture(s) applied to the light side of your planet. You can open the select texture window by pressing the ☉ button. Then depending on your **Surface → Configuration** search for either **'Planet Surface Sphere Day'** or **'Planet Surface Cube Day'**, and you'll see a list of suitable prepackaged textures.

Note: For improved rendering quality, I recommended that you modify your texture import settings so that the **Filter Mode** is set to **Trilinear**, and you increase the **Aniso Level** value to 4 or more.

Night
This allows you to set the texture(s) applied to the dark side of your planet. You can open the select texture window by pressing the ☉ button. Then depending on your **Surface → Configuration** search for either **'Planet Surface Sphere Night'** or **'Planet Surface Cube Night'**, and you'll see a list of suitable prepackaged textures.

Note: For improved rendering quality, I recommended that you modify your texture import settings so that the **Filter Mode** is set to **Trilinear**, and you increase the **Aniso Level** value to 4 or more.

Normal
This allows you to set the normal map(s) applied to your planet. You can open the select texture window by pressing the ☉ button. Then depending on your **Surface → Configuration** search for either **'Planet Surface Sphere Normal'** or **'Planet Surface Cube Normal'**, and you'll see a list of suitable prepackaged textures.

Note: Because modifying the **Planet → Lighting Gradient** gives you full control over the lighting, it's easy to make lighting that looks bad when combined with a standard normal map. To fix this you may have to modify your normal map to be less bumpy/contrasting.

Note: For improved rendering quality, I recommended that you modify your texture import settings so that the **Filter Mode** is set to **Trilinear**, and you increase the **Aniso Level** value to 4 or more.

Specular
This allows you to set the specular texture(s) applied to your planet. You can open the select texture window by pressing the ☉ button. Then depending on your **Surface → Configuration** search for either **'Planet Surface Sphere Specular'** or **'Planet Surface Cube Specular'**, and you'll see a list of suitable prepackaged textures.

Note: For improved rendering quality, I recommended that you modify your texture import settings so that the **Filter Mode** is set to **Trilinear**, and you increase the **Aniso Level** value to 4 or more.

Detail
This allows you to set the detail texture applied to your planet. You can open the select texture window by pressing the ☉ button. If you then type in **'Planet Surface Detail'**, you'll see a list of suitable prepackaged textures.

Note: The packaged sphere meshes aren't designed to have detail maps applied. I advise you your **Surface → Configuration** to **Cube** or use the **Surface Tessellator** component if you want to use them without correct results.
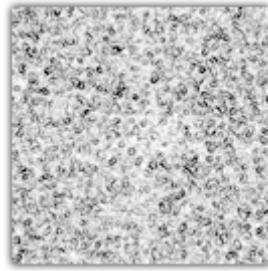
Atmosphere

If you enable this field then your planet will be surrounded by a volumetric atmosphere.

Mesh

This should be a mesh of an inverted sphere, if you click the ☉ find button and type in **'atmosphere'** into the search box then you'll see a list of surface meshes that come with SGT, it should look like the image to the right.

The **Sphere** and **Geosphere** meshes are similar, and they only differ in their triangle layout. But **OffsetSphere** is offset so that depth sorting will occur at the edge of the atmosphere mesh, this is useful if you have a large atmosphere very close to a small atmosphere and encounter depth sorting issues.

Render Queue

This changes the render queue used by the atmosphere material. Consult the official Unity documentation if you're unsure what this means.

Height

This changes the distance between the planet surface and the atmosphere edge.
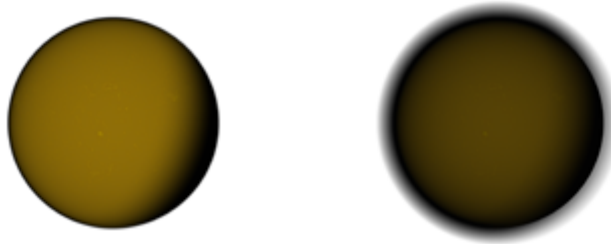
Density Colour

This gradient allows you to set the colour and alpha of the atmosphere based on the optical thickness to that point in the atmosphere (the optical thickness will be greatest at the horizon).

The key at the centre of the gradient indicates the horizon colour, this key is locked so you cannot move or remove it, but you can change its colour. The right side of the gradient is the sky colour, and the left side of the gradient is the surface colour.

Here are some examples of atmospheres with different density gradients.
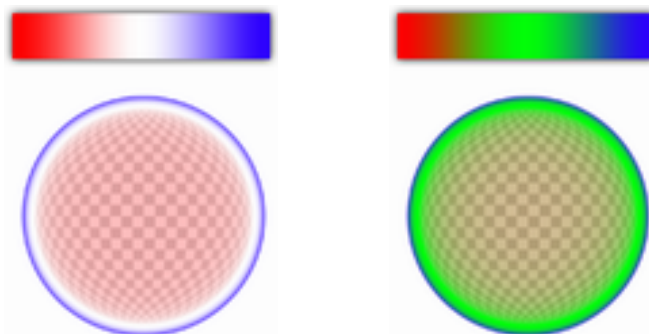
Twilight Colour

This gradient allows you to change the sunset/sunrise colour. The left of the gradient indicates the dark side of your planet, and the right side indicates the light side.

Here are some examples of atmospheres with different twilight gradients.

Note: This gradient is multiplied with the **Planet → Lighting** gradient, so any twilight colour you set on the night side won't be seen unless you extend the lighting into the dark side.
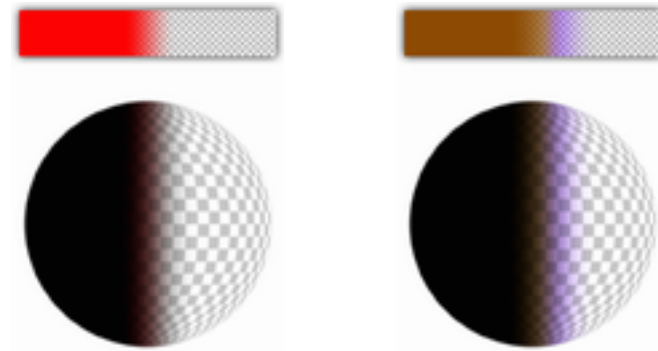
Night Opacity

This allows you to change how thick the atmosphere is on the dark side. A high value means that you won't be able to see any stars during nighttime if your camera is inside the atmosphere.

Sky Altitude

This allows you to change the point at which your atmosphere's density reaches maximum. A lower value means you need to travel deeper into the planet's atmosphere before you can see the sky colour change.
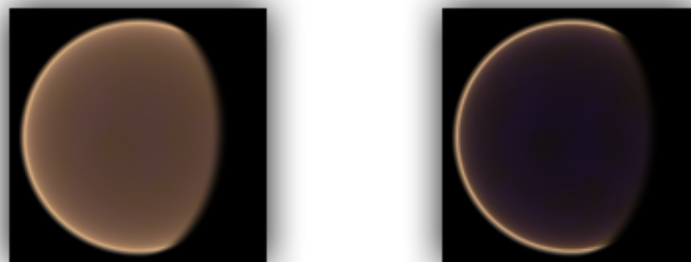
Fog

This allows you to change how thick the atmosphere appears on the horizon.

Note: This should be kept at quite a low value, because the fog is calculates per-vertex, so you will see undesirable vertex blending with high values.
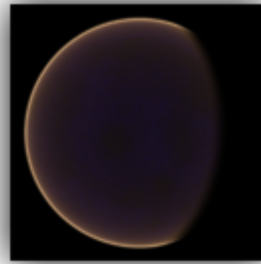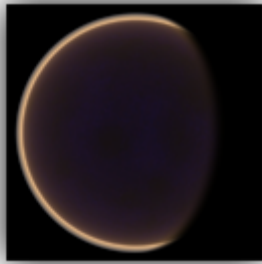
Falloff
Surface

This allows you to change the total atmospheric density of the planet's surface.

Outside

This allows you to change the total atmospheric density surrounding the planet's surface when the planet is being viewed from space.

Inside

This allows you to change the total atmospheric density of the sky when the camera is inside the atmosphere.

Scattering

This allows you to add atmospheric scattering to your planet.

Mie

This allows you to control how bright the front and back parts of the atmosphere are. For example: If your camera is on the surface of your planet and your light source is facing North on the horizon, Mie scattering will cause the North and South sides of the sky to brighten, leaving a dark band across the sky from East to West.

Note: This field is only visible when **Atmosphere → Scattering** is set.

Rayleigh

This allows you to control the size of the glow around your light source.

Note: This field is only visible when **Atmosphere → Scattering** is set.

Clouds

If you enable this field then your planet will be surrounded by a cloud layer.

Configuration

This is the same as the **Surface → Configuration**, except it applies to the cloud layer instead.

Mesh

This is almost the same as **Surface → Mesh**, but you should search for '**clouds**' instead of '**surface**'. (Actually, they're the same meshes so it doesn't matter at all)

Texture

This is the cloud texture(s) applied to the cloud mesh, this can be transparent.

Note: For improved rendering quality, I recommended that you modify your texture import settings so that the **Filter Mode** is set to **Trilinear**, and you increase the **Aniso Level** value to 4 or more.

Render Queue

This is the render queue used by the cloud material. Consult the official Unity documentation if you're unsure what this means.
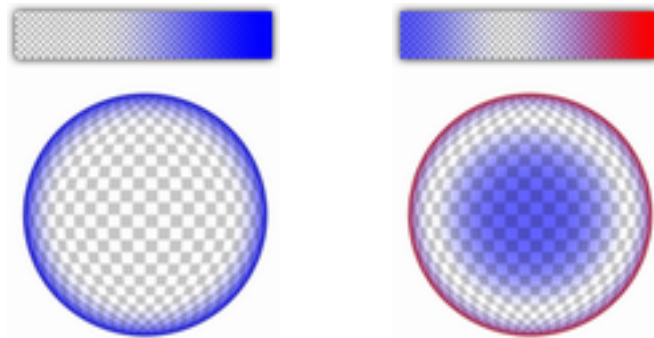
Height

This is the distance between the planet surface and the cloud surface.

Note: If you're using an atmosphere, this value should probably be set lower than **Atmosphere → Height**.

Limb Colour

This gradient allows you to add colours to the edge (limb) of your cloud layer.

Falloff

This allows you to fade the cloud layer out, starting from the edge. A higher value means the edge of the cloud layer will become increasingly harder to see until eventually the whole cloud layer is invisible.

Rotation Period

This allows you to specify how many times the cloud layer rotates around the planet surface per second.

Offset

This allows you to move the cloud layer closer to the camera, this is useful if you have depth sorting issues with the atmosphere.

Twilight Offset

Note: This field is only editable if your planet has an atmosphere.

This allows you to shift the **Atmosphere → Twilight Colour** forwards or backwards. This is useful if you don't want the sunrise/sunset colour to be very prominent on your cloud layer.
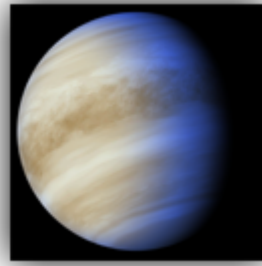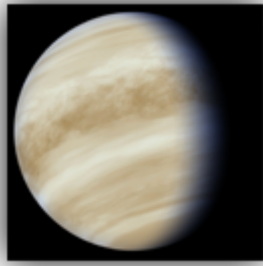
Shadow

If you tick this then your planet can receive a dynamic shadow from either a planetary ring, or a planet/moon.

Caster

Type

This field allows you to choose between the type of shadow being cast on your planet.

● Ring

Ring shadows can be cast from the **Ring** or **Asteroid Ring** components, you can also manually define it.

● Planet

Planet shadows can be cast from the **Planet**, **Star**, or **Gas Giant** components, you can also manually define it.

GameObject

Note: Requires **Shadow → Caster → Type** to be set to **Planet**.

This field allows you to set the GameObject casting a shadow on your planet, this GameObject can be empty.

Auto Update

If your **Shadow → Caster → Type** is set to **Ring**, then the **Shadow → Caster → Radius + Width** fields will automatically be filled in.

Note: If these components can't be automatically found (e.g. your hierarchy layout is different) then you should disable this option and manually set the **Radius** and **Width**.

Radius

This is the radius of the shadow caster. If your **Shadow → Caster → Type** is set to **Ring**, then this is the radius at the centre of your ring.

Width

This is the width of your shadow caster. If your **Shadow → Caster → Type** is set to **Planet**, then this is the width of the soft-shadow area (penumbra).

Texture

For this to render correctly, you must modify your texture import settings so that the **Wrap Mode** is set to **Clamp**.

Note: For improved rendering quality, I recommended that you modify your texture import settings so that the texture **Format** is set to **Automatic Truecolor**, the **Filter Mode** is set to **Trilinear**, and you increase the **Aniso Level** value to 4 or more.

Surface

This is the shadow texture applied to the surface mesh.

Atmosphere

Note: You can only edit this field if your planet has an atmosphere.

This is the shadow texture applied to the atmosphere mesh.

Clouds

Note: You can only edit this field if your planet has a cloud layer.

This is the shadow texture applied to the cloud mesh.