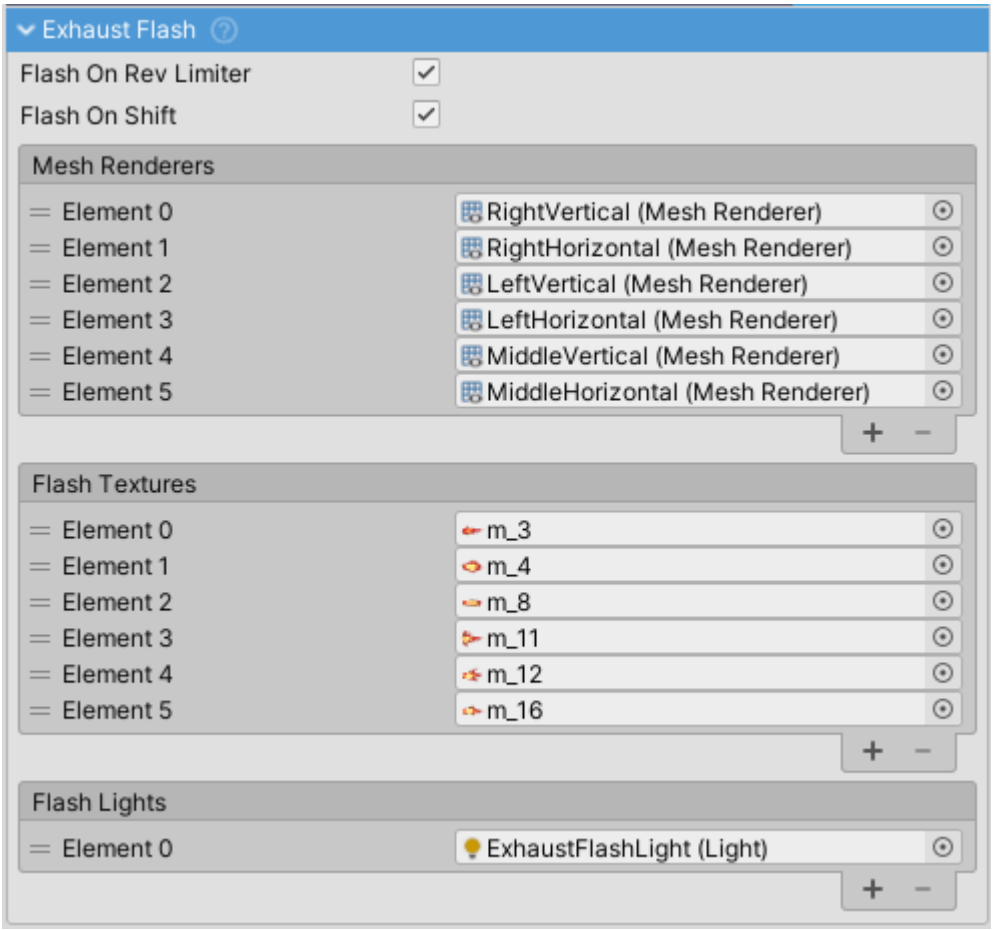
EffectsManager menu.

Effect system makes use of VehicleComponents and therefore each `Effect` can be turned on or off, be enabled or disable or have LOD set.

- All `Effects` with *manager* in the name manage multiple instances of the effect, usually one for each wheel - e.g. skidmarks or surface particles.

Exhaust Flash



ExhaustFlash inspector.

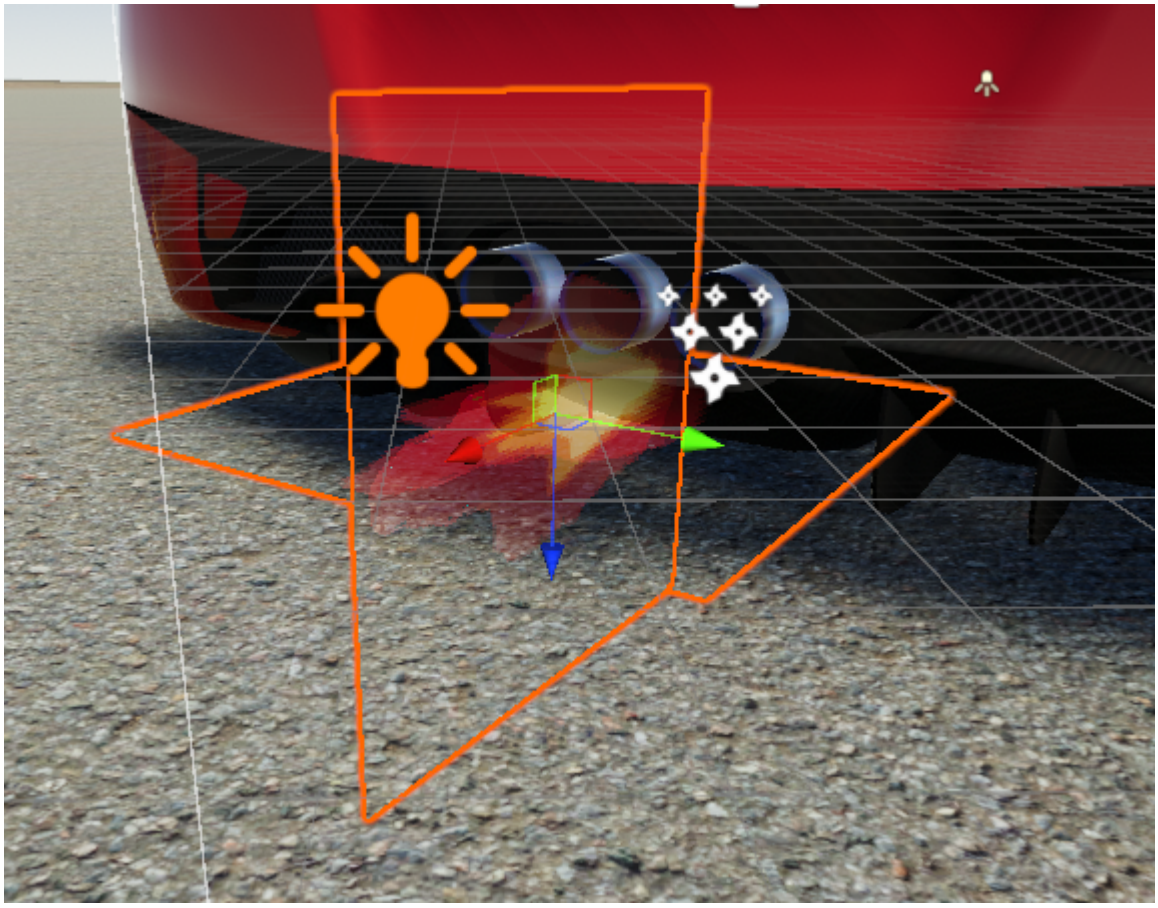
`ExhaustFlash Effect` is used to imitate flames shooting out of exhaust. The method to achieve this is identical to the one used for most muzzle flash in FPS games; that is a set of images gets enabled and disabled at rapid rate with different sprite and scale each time. This is a performant way to achieve the effect while avoiding particle effects.

Setup

Adding Quads

- Create and place two Quads perpendicular to each other. Move them to the location of the exhaust.

- Remove any colliders from Quads.
- Create a new material that uses `Particles/Standard Unlit` (Unity 2019) or equivalent shader with `Transparent` rendering and `Multiply` color mode. The included example on *Sports Car* prefab can be copied. Assigning one of the included flame textures will show if the rotation of the Quad is correct. Rotate Quad if needed.



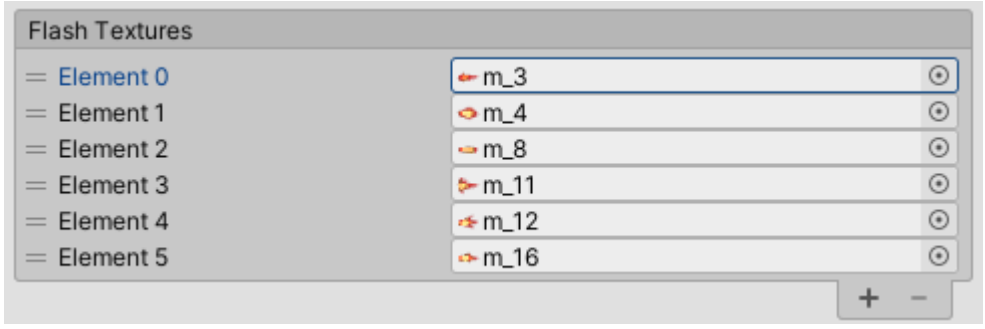
Two perpendicular quads with flame sprites.

- Assign the `MeshRenderers` from the newly created Quads to the `ExhaustFlash` ⇒ `Mesh Renderers` list.

Assigning Textures

To make flames look more convincing a random texture is assigned to each Quad on each flash. A number of default textures is included.

- Assign textures to `Flash Textures` list.



`Flash Textures` list.

Adding Point Lights

If the material used for exhaust flash is not emisive adittional `PointLight`(s) can be added to light the surrounding area on flash.

- Set up a `PointLight` and place it at the exhaust location.
- After configuring, disable the light.
- Add the light to the `Flash Lights` list.

`Flash Lights` list.
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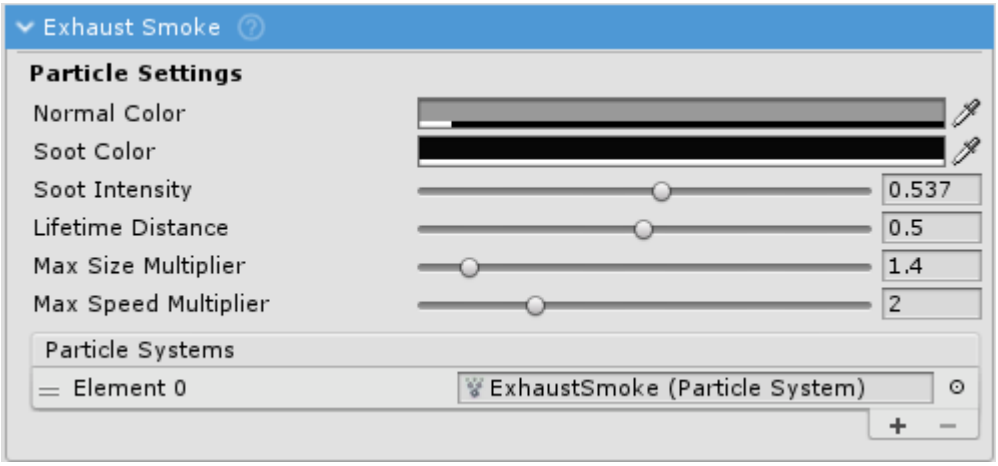
Exhaust Smoke



ExhaustSmoke inspector.

ExhaustSmoke controls exhaust `ParticleSystem` color, size and emission speed. It interpolates between `NormalColor` and `SootColor` based on engine state.

Setup

- Position `ParticleSystems` at vehicle exhaust position. Prefab of pre-configured `ParticleSystem` comes with the asset (*Effects* > *Particles* > *Prefabs*).
- Assign the `ParticleSystems` to the `Particle Systems` list inside ExhaustSmoke inspector.

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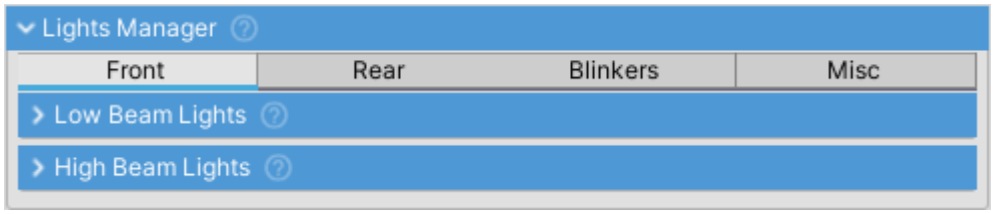
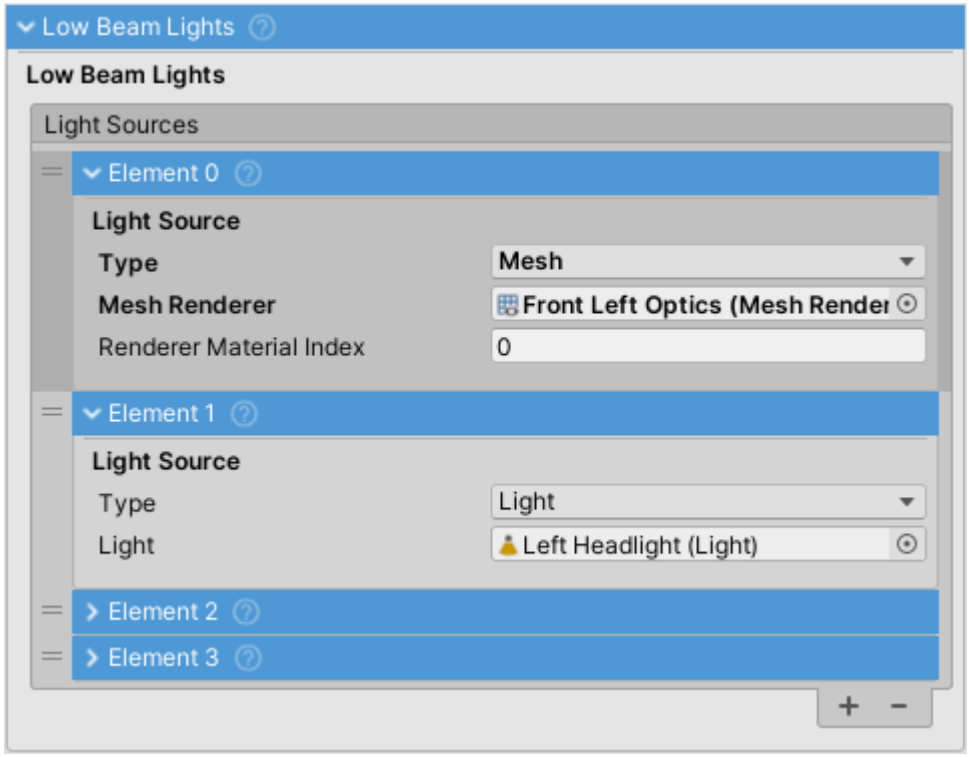
Lights Manager



LightsManager inspector.

`LightsManager` is tasked with turning `VehicleLights` on or off depending on user input.

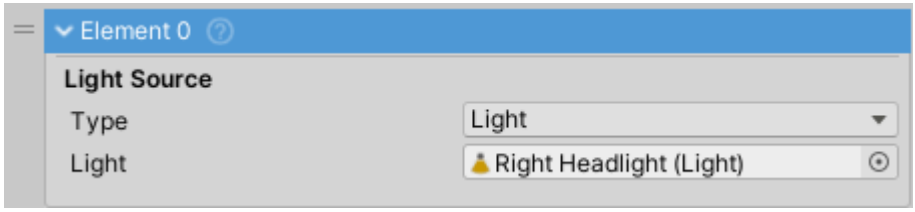
Vehicle Light



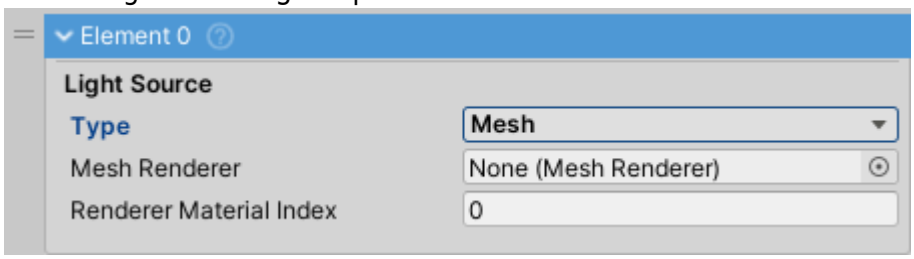
VehicleLight inspector.

`VehicleLight` is a collection of `LightSources`. When the light is turned on all `LightSources` are turned on and vice versa.

Light Source



VehicleLight with `Light` option selected.



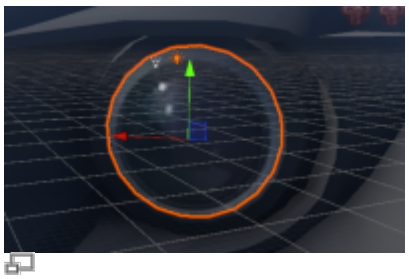
VehicleLight with Mesh option selected.

One vehicle light source. Can be a Light or emissive Mesh.

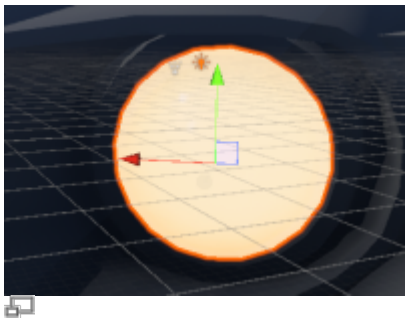
- If Light is selected as Type any Unity Light can be assigned. It will be turned on and off according to user input.
- If Mesh is selected as Type any Mesh with Standard shader can be used. It's Emission field will be toggled to imitate a working light. Since this does not emit enough light to be a headlight usually another light source is used in tandem, this one with SpotLight assigned.

For an emissive mesh light to work it needs to be a separate object. If the model does not come with lights and blinkers as separate objects these will need to be separated in 3D modelling software such as Blender (free, open source).

When using Mesh light source make sure to tick the Emission checkbox on the material. This lets Unity know that this variant of the material is in use and should be included in the build.



Mesh with Emission turned on.



Mesh with Emission turned off.

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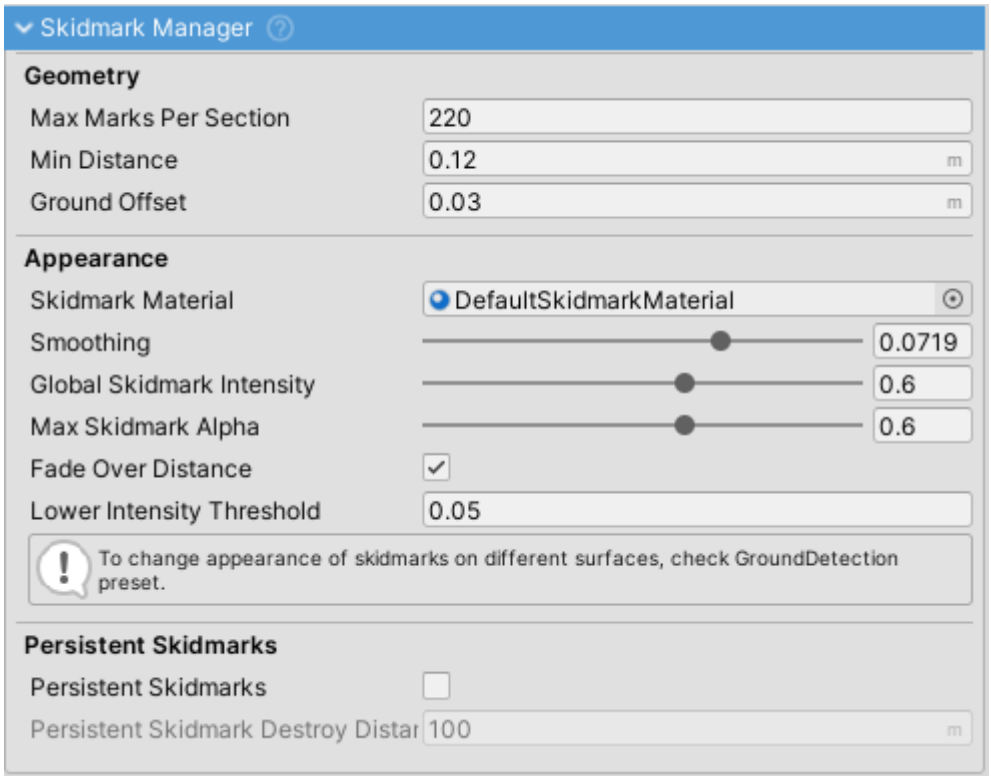
Skidmark Manager



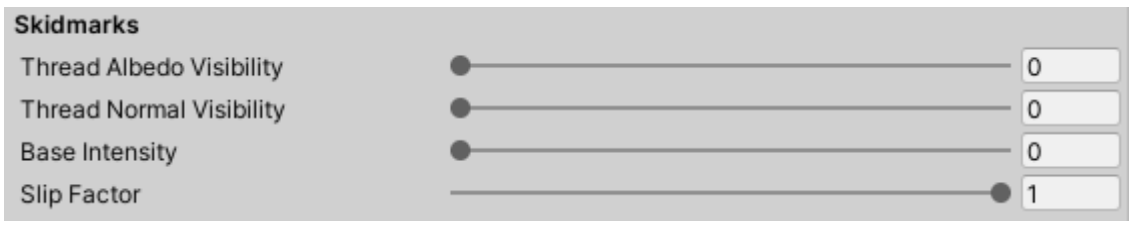
SkidmarkManager inspector.

Skidmarks are generated when wheel skids / slips over a surface.

- Skidmarks are achieved by procedurally generating a mesh. One mark consists of two triangles and the number of triangles per one section can be calculated as `Max Marks Per Section` * 2.
- `Min Distance` is the distance a wheel needs to travel before a new mark is created.
- Default behavior is to delete the oldest triangles as soon as number of marks reaches `Max Marks Per Section` - similar to the old snake game. To make this transition smooth `Fade Over Distance` can be enabled or `Peristent Skidmarks` can be used. Check the section below for more info.
- If skidmarks are not visible or clip into the terain `GrounOffset` needs to be increased.
- To define when the wheel is slipping `Longitudinal Slip Threshold` and `Lateral Slip Threshold` from vehicle settings tab are used.

Surface-based Skidmarks

- Skidmarks use settings of currently active `SurfacePreset` to get the settings for the current surface type.



Skidmark section of `AsphaltTireFrictionPreset`.

- Also check GroundDetection page for more info.

Persistent Skidmarks


Persistent skidmarks enabled.

- Persistent skidmarks get stored into sections of `Max Marks Per Section` size.
- Sections do not get destroyed as longs as the the player is under `Peristent Skidmark Destroy Distance`.
- Downside to this approach is that over time this will cause the number of triangles in the viewport to increase.

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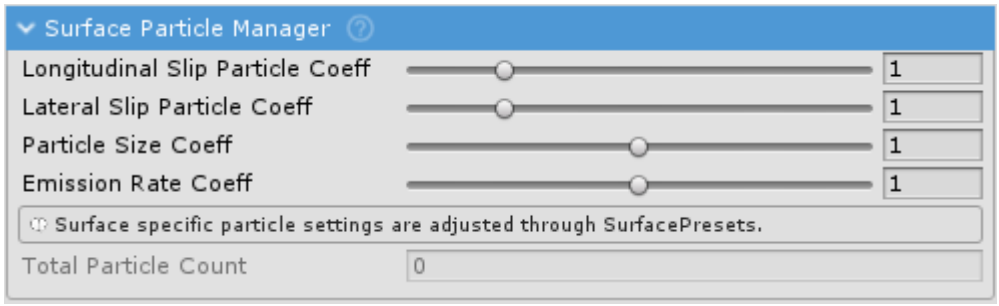
Surface Particle Manager



SurfaceParticleManager inspector.

`SurfaceParticleManager` creates and manages particles based on current `SurfacePreset` settings.

- Particles are emitted on per-wheel basis. Total surface particle count is a sum of particle counts from all the wheels' `ParticleSystems`.
- `Lateral Slip Threshold` and `Longitudinal Slip Threshold` under *Settings* tab determine the lowest wheel slip threshold needed for wheel to be considered to be slipping. This affects particle effects.

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Mirrors

Mirrors are set up through a combination of `Cameras`, `RenderTextures` and `Materials` with specific UV mapping.
Camera first renders its view to a `RenderTexture` which is assigned to a `Material`(any shader that supports albedo map will work). This `Material` has an UV map that corresponds to the surface of the vehicle mirror.

Possible setups are:

- Render each mirror with a separate `Camera` to a separate `RenderTexture` which is assigned to a separate `Material`. Best visual quality but slow.
- Using UV map that is split between the mirrors which means that each mirror gets only a part of the UV map, but this comes at a disadvantage that the interior of the vehicle can not be seen in rearview mirror since the camera needs to start rendering at the rear of the vehicle to prevent intersection with the vehicle mesh.
- Hybrid approach: one camera for rearview mirror and one camera for left and right mirrors.

This guide will demonstrate how to set up mirrors on a vehicle using Blender.

From:
http://nwhvehiclephysics.com/ - **NWH Vehicle Physics 2 Documentation**

Permanent link:
http://nwhvehiclephysics.com/doku.php/NWH/VehiclePhysics2/Effects

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