Configure lights and light rooms

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Note: The illumination of the car body cannot be tested in the ContentTool! This must be done in LOTUS itself.

1 Principles

1.1 Light rooms

The so-called light roms were introduced to allow different light sources to be effective in different areas of the vehicle - e.g. driver's compartment and passenger compartment. If there were no light rooms, the light from the passenger compartment would also illuminate elements of the driver's compartment that are close to the light source, but in reality are separated by a wall.

For this reason, light rooms are set up and the light sources are assigned to them. This means that certain light sources only ever illuminate one light room.

The assignment is done via the material properties. Accordingly, "interior light sources" can also be switched off completely for certain materials.

A light room can also be "outside", if, for example, light sources are to illuminate the outer skin but not the landscape (which is strongly recommended for performance reasons if their influence on the landscape is low anyway.

1.2 Maximum number of lights

The number of light sources per light room is basically unlimited! In a certain area, however, the next 8 light sources at most become effective (or fewer depending on the graphic setting). For this reason, in unfavourable cases, reduced light ranges may occur at certain points if the responsible light sources change there but are still so bright that this change is relevant.

1.3 Priorities

In order that important/larger light sources can be preferred over smaller/less important light sources, the

light sources can be given priority. For scenery objects the following convention should be followed:

- Any floodlights that are still "above" normal street lights are given priority +1
- Normal streetlights get priority 0
- Sidewalk luminaires receive priority -1
- Detailed light sources such as those in bus stop shelters get priority -2

Priorities can also be used in vehicles - of course we do not prescribe any conventions here, each vehicle developer can adjust this for himself.

2 Parameters

In the following all parameters of the light rooms and light sources are presented and explained.

2.1 Light rooms

- Name: The name of the light room is only for differentiation and has no influence on the function
- Resolution: Internally, the light space can be imagined as a texture, where each pixel tells the graphics card which light sources are used there. If the light sources are "normal sized" (interior lighting etc.) the default value of 2 meters per pixel can be kept.

2.2 Light sources

- Name: The name is only for distinction and has no influence on the function
- Origin: The position of the light source. For rod light sources, this is the one end point of the rod.
- Color & Intensity: The color of the light source. The intensity serves as a multiplier and its main purpose is that a script variable can be assigned to it to control the brightness of the light source. However, variables can also be assigned to the three RGB values; then the script can also influence the color.
- Type: Radiation characteristic of the light source
    - Point light: Light source emits the same brightness in all directions ("light bulb")
    - Spot: Light source mainly shines in a certain direction ("spotlight")
    - Rod light source: Radiation is uniform along a line instead of from a point
- Illuminates own object: This check mark must be set if the object is to be illuminated by the light source itself, e.g. in the case of interior lighting or spotlights which illuminates a building from the outside.
- Illuminates this light space: In case the previous check mark was set, the light space that can be illuminated by this light source must be selected.
- Illuminates scenery: ATTENTION: This parameter is ONLY effective if "Illuminates own object" is NOT switched on! In this case, the light source illuminates the environment and itself, but does not consider light spaces (example: a headlight whose light also falls on the clutch).
- Calculation of the light beam: Here you have to select the graphic setting at which the light source casts a light beam. There is an option "Detail light sources" in LOTUS. Depending on whether this is switched on or off, less important light sources should also be switched on or off when calculating the illumination of objects by light sources.
    - Always: This is a light source that is so important that it should illuminate its surroundings in all graphic settings, e.g. the driver's cab light
    - Only if D.-L- is activated: Particularly bright indicator lamps can, for example, brighten up the driver's compartment very effectively if the driver's compartment lighting itself is switched off.

However, this is a rather unimportant special effect, which is why these indicators should be set to this setting
    - Only if D.-L. is deactivated: If the passenger compartment is brightened with a large number of individual lights, for example, these can be given the previous setting "only if D.-L. is activated" and - if the user switches off the "detail light sources" option - deactivated to make calculation easier. So that the passenger compartment is not dark then, an alternative lighting is placed in the form of only one rod light source, which then takes over the task. This light source then receives the setting "only if DI.L. is deactivated".
- Distance of the beginning of the light fall-off: All illuminated areas which are closer to the light source are illuminated with constant brightness (calculated from basic intensity * (variable) intensity).
- Ambient portion: Determines the brightness of the surfaces that are not directly illuminated by the light source because they are facing away from it. 0 = black, 1 = alignment is completely irrelevant. For interiors, experiment with values between 0.1 and 0.5, outside this value is generally 0.
- Maximum range: To reduce the edges mentioned above in the description of the light sources, this parameter can be used to ensure that the light source is guaranteed not to continue to shine. While the decrease in brightness is normally exponential and thus theoretically infinite, in this case a factor is superimposed that runs linearly towards zero up to this distance. The maximum range is thus reached "softly".
- Exponent: Determines the strength of the drop in brightness from the "distance of the beginning of the light drop": 1 = linear-inverse (standard), 2 = square-inverse, etc.
- Visible light source: Should the light source also be directly visible, instead of only by its effect on surrounding surfaces?
- Inside the vehicle': light sources inside the vehicle must be drawn in a different order to the vehicle than light sources outside the vehicle. The setting is only relevant with regard to "visible light sources".
- Rotatability of the visible light source towards the observer: Should the light "spot" always rotate towards the observer or always be aligned in the same way?
- Size of the visible light source: Extension of the "light spot
- Lq. brightness: An additional factor that is superimposed on the color and intensity factors already mentioned above and only affects the "light spot".
- Displacement towards the observer: It happens that the light spot "bores" itself unattractively into surrounding objects, especially if the light source is viewed from the side and the light spot is allowed to turn towards the observer. In this case the light spot can be moved towards the viewer. It then seems to stay in the same place, but the errors caused by "drilling" are reduced or completely prevented
- Light effects: With this you can add additional light effects. "Fog" of course only works in low visibility and becomes stronger the denser the fog is.
- Direction of the light cone: The center axis of the light cone in spot or rod light source mode.
- Inner cone: Within this cone the intensity is maximum
- Outer cone: from the inner to the outer cone the intensity decreases continuously until the...
- Minimum intensity outside the cone, which is applied evenly until
- Outer cone boundary, behind which there is no more light emission.

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- Up/down time: Speed with which the light intensity increases and decreases - controlled by a script variable. The higher the value, the faster the adjustment.
- Length: The distance of a rod light source from one end, defined by the origin, to the other end.
- Ignore if off: Each scenery light source must reserve an area on the map, which then cannot be reserved by other light sources. However, in case a light source is not used permanently anyway - e.g. due to the initial configuration - it does not need to take space from other light sources. To

prevent this, this option must be switched on.