

Blender Exporter for MSTS/OR

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NOTE - THIS PROGRAM IS A WORK IN PROGRESS -
THERE ARE SEVERAL INCOMPLETE AREAS

I DON'T HAVE PLANS TO CONTINUE DEVELOPMENT OF THIS PROGRAM
I AM RELEASING IT UNDER GPL
IN THE HOPE IT MAY BE HELPFUL TO THE COMMUNITY
AS A BASE FOR FURTHER WORK.

This is a script addon for the Blender 3D program. Look for it in Blender's File / Export menu. It provides a means to create .S shape files for Microsoft Train Simulator or Open Rails.

NOTE: The exporter creates the .S file only. All other related files must be created manually by other programs. For example:

- for scenery objects, you must create the .SD file yourself and add an entry to the .REF file.
- for rolling stock you must create the .ENG or .WAG file
- you must convert the texture images to .ACE files and place them in the correct directory.

CAUTION - This program is currently incomplete. Some of the major areas yet to be finished are:

- providing a progress bar or other indicator during the export operation
- support for additional MSTS shaders
- support for extended OpenRails shaders
- packaging the program as a proper 'Blender Addon'

INSTALLATION

This exporter is a script addon for Blender.

Copy the 'scripts' folder tree from the installation zip to your USER folder.

On a windows Vista or 7 machine your USER folder will be at:

C:\Users\{username}\AppData\Roaming\Blender Foundation\Blender\2.6x
(where 2.6x represents the current version of Blender)

See the blender manual [here](#) for more info on locating your USER folder.

The directory structure should look like this:

```
...2.6x
  \scripts
    \addons
      MSTSDLevels.py
      MSTSExporter.py
```

In your USER PREFERENCES enable the following two ADDONS:

Import-Export: Export OpenRails/MSTS Shape File(.s)

3D View: MSTS Distance Level Selection

EXAMPLES INCLUDED IN PACKAGE

Building\UnionStop - provides an example of a simple scenery model that uses two different textures.

Loco\L1 - provides a more complex example that includes animation and LOD levels.

GETTING STARTED

- the object to be exported must be called MAIN
 - all children of MAIN will be exported as part of the model
 - MAIN must be in the root of the scene (ie not a child object of something else)
 - cloned objects, object modifiers and particle systems are fully supported
 - if an object is not textured in Blender, the default texture, blank.ace, will be applied.
 - its best to operate Blender with 'Render Mode' (in top menu bar) set to 'Blender Game'
-
- step by step to export a cube as a scenery object to MSTs
 - open Blender
 - rename the cube object to 'MAIN'
 - click on File Export OpenRails/MSTs
and export as CUBE.S into your route's SHAPES folder
 - create a CUBE.SD file and put it in your route's SHAPES folder
 - create a BLANK.ACE and put it in your route's TEXTURES folder
 - add the cube to your route's .REF file

NOTE: There is no progress indicator during export. The program will appear to hang when exporting large files. Before you begin the export, toggle ON the system console (under the window menu) to see progress.

NOTE: The exported shape is centered about the blender global center (0,0,0). Scaling is applied before exporting.

OPTIMIZATIONS

The script includes a number of optimizations for higher frame rates and better GPU and CPU usage including:

- Primitive consolidation which reduces batch calls by consolidating tris from different objects when they use the same material
- Large primitives, vertex_sets, and subobjects are split as needed to prevent them from exceeding MSTs's loading limits.
- Complex hierarchies are simplified and collapsed to prevent exceeding MSTs's hierarchy depth limits and to improve effectiveness of the primitive consolidation

MATERIALS

Blender to MSTS Material Conversion. Any setting not mentioned is ignored by the exporter.

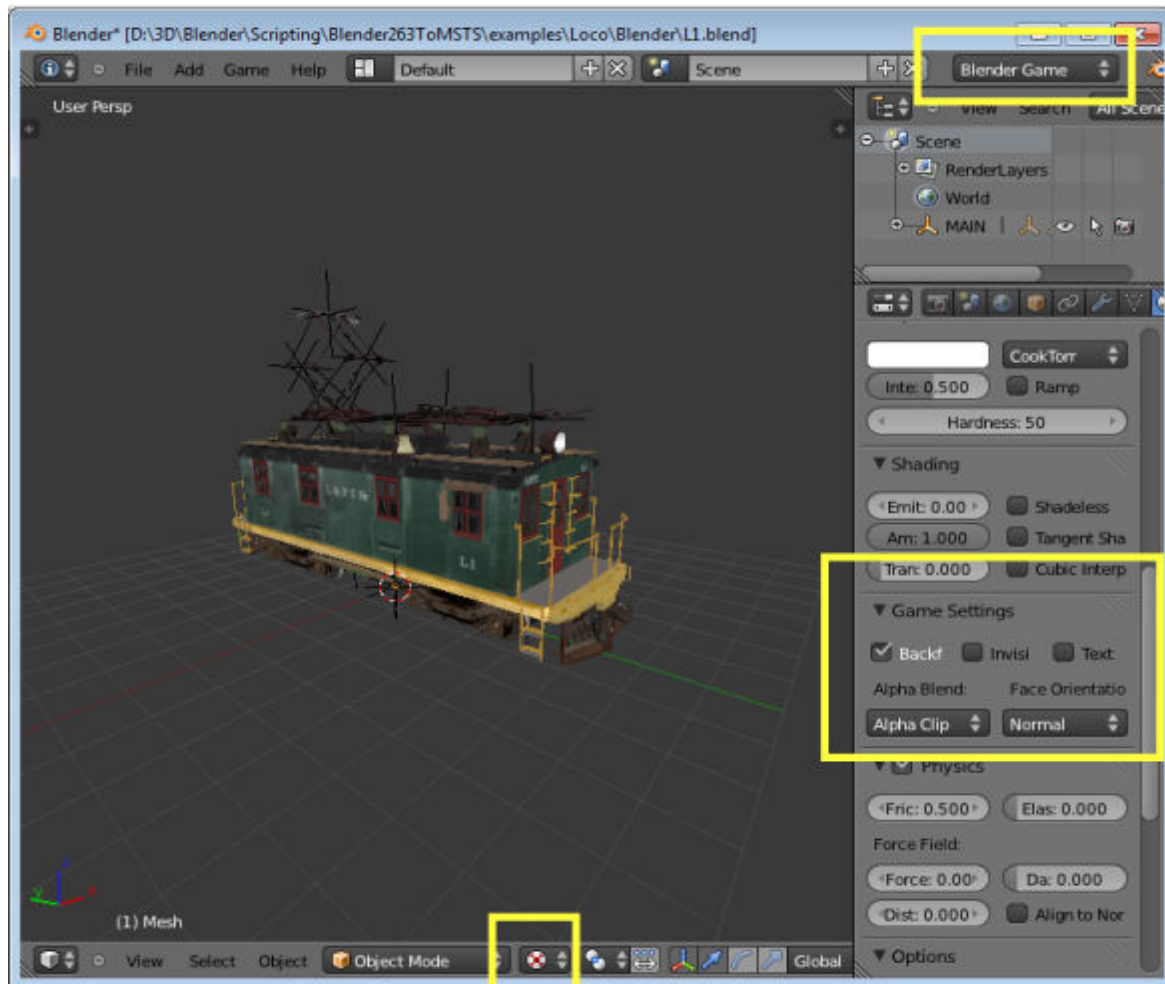
Game Settings

- Alpha Blend - Opaque -> MSTS TexDiff
 - Alpha Clip -> MSTS BlendATexDiff with clipping
 - Alpha Blend -> MSTS BlendATexDiff no clipping (note Alpha Sorting is not yet supported)

Shading

- Shadeless -> MSTS cruciform shading (if Shadow - Receive is off)

Set your viewport shading to 'Texture'. If you can see it in the viewport, you should be able to see it in MSTS.



TEXTURING

The mesh must be UV mapped with a single UV layer. Texture images are assigned according to the applied 'Face Texture' on the first UV layer. Multiple images can be applied to different parts of the same mesh. See the section 'Assigning to Faces' in the Blender manual here (http://wiki.blender.org/index.php/Doc:2.6/Manual/Textures/Mapping/UV/Applying_Image)

Recommended practice is to have all texture images in a subfolder called 'textures'.

Set 'Shading' to MultiTexture in the display panel (press N, its in the lower right)

GENERATING LOD's

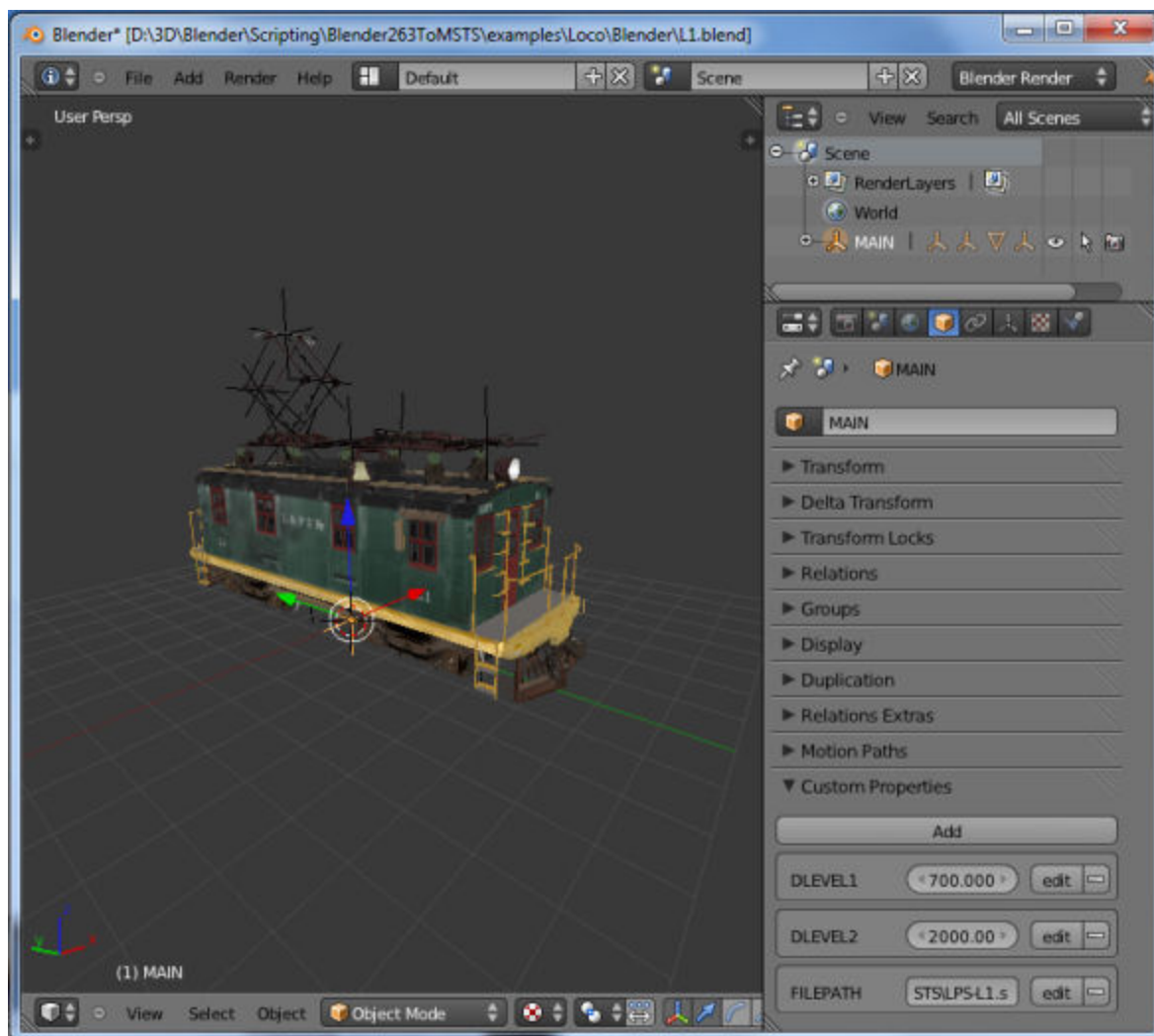
By default, the shape file will be generated with a single LOD set at 1000 meters.

You can control this by adding 'Custom Properties' to your 'MAIN' object.

See the screen shot below. Click on your MAIN object. Then find 'Custom Properties' at the bottom of the right panel. Click 'add' and then 'edit' it to create custom properties like these:

DLEVEL1 = 200 creates a LOD for 0 to 200 meters

DLEVEL2 = 1000 creates a LOD for 200 to 1000 meters

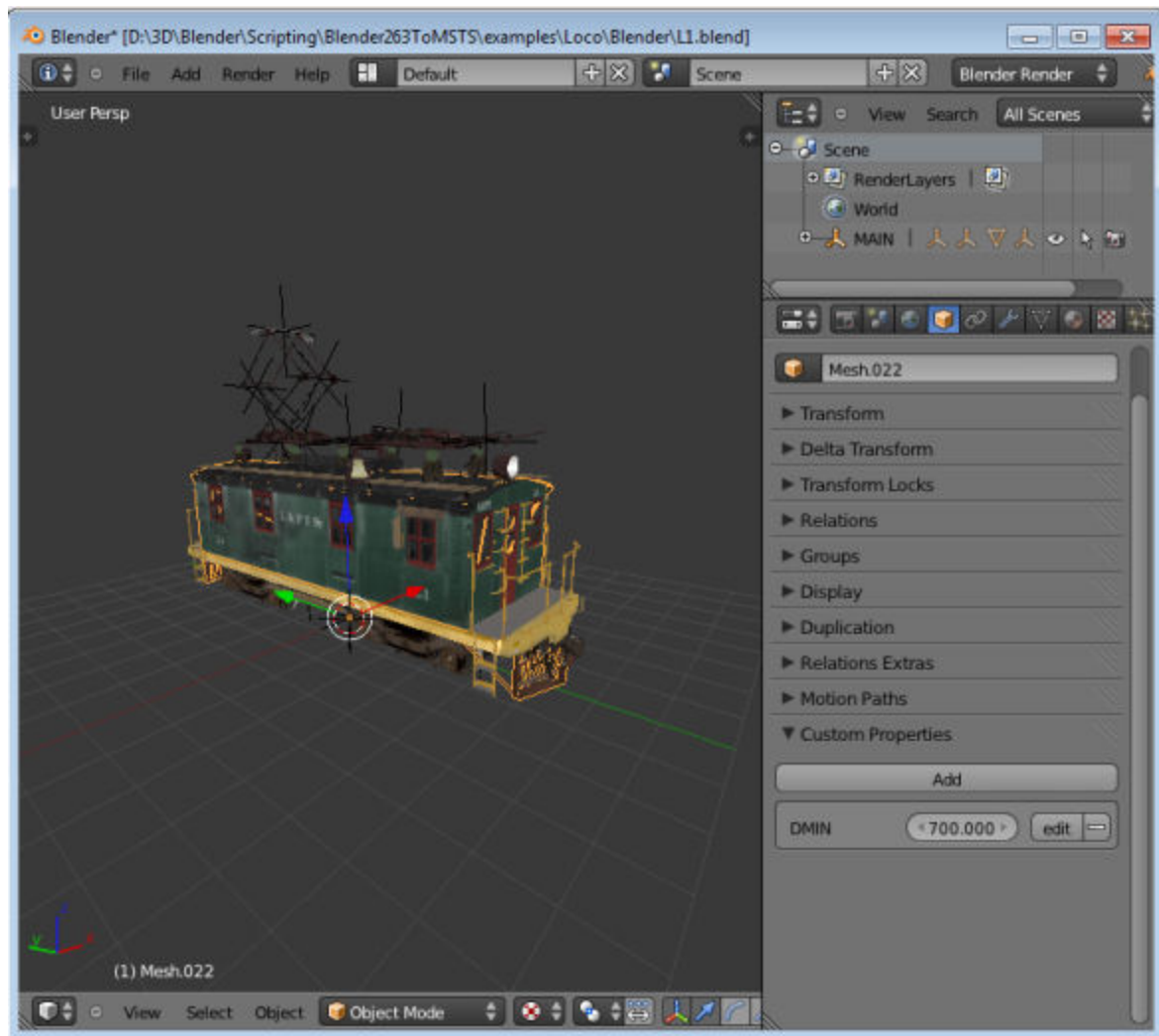


You control what meshes are included in each DLEVEL by setting their visibility limits. This is

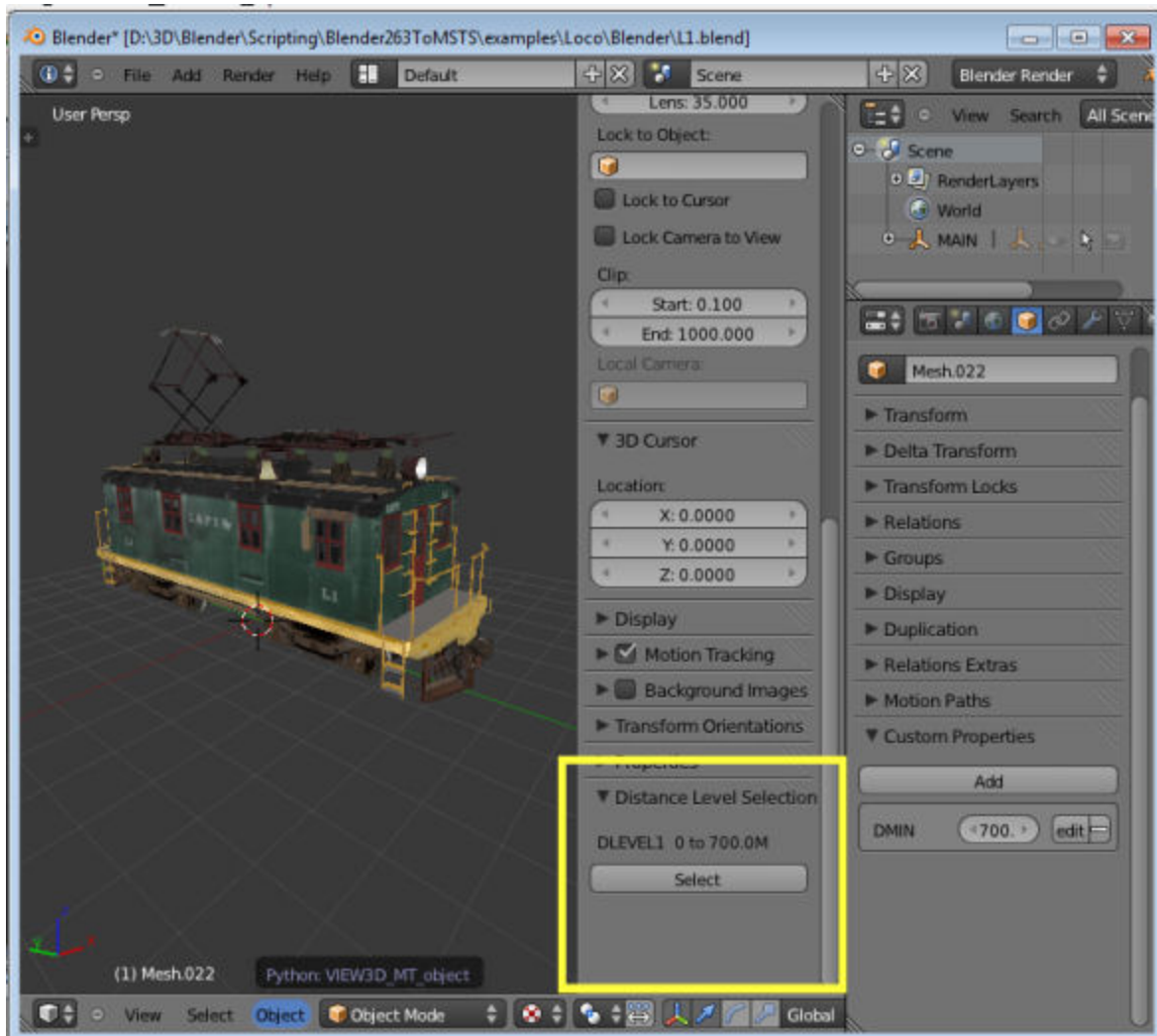
done by addition custom properties to them. Click on a mesh object and add custom properties like these to any mesh object

DMAX = 500 object goes out of view at 500 meters

DMIN = 500 low res object comes into view at 500 meters



You can preview how each LOD will look using the Distance Level Selection control. Press 'N' to bring up your display panel. You'll find the control in the lower right. Pressing 'Select' cycles through each LOD, hiding objects that are not visible in this LOD.



NEW FEATURES TODO

Mesh Property NORMALS =

OUT	# normals radiate out from center of model
UP	# all normals face up (ie for unshaded appearance with shadows)
FILLET	# bevels appear rounded
OUTX	# experimental - normals radiate out along Y axis (ie for track edge veg.)

- support UV wrapping

```
if material.use_face_texture:
```

```
# note applies to all images - no 'per image' settings
```

```
    if itex.extension == 'EXTEND':
        textureAddressMode = 4 # border
    elif itex.extension == 'CLIP':
        textureAddressMode = 3 # clamp
    elif itex.use_mirror_x or itex.use_mirror_y:
        textureAddressMode = 2 # mirror
```

- support DMAX applies to everything below it in the hierarchy, ie linked

- support 'casts shadows' and 'receives shadows'

- support 'single sided' and 'double sided'