

Table of contents

1	Thanks	3
2	Presentation	3
3	Configuration file for IGS export	4
3.1	Presentation	4
3.2	UV arguments section.....	5
3.3	Material attribute modification	5
3.4	Miscellaneous options	6
3.5	Texture file names replacement.....	7
4	Optional configuration file for IA export	8
4.1	FrameRateMultiplier	8
4.2	RemoveLastFrame	8
5	Additional configuration for IGS export.....	9
5.1	Texture slots mapping with TS2013 shaders.....	9
5.2	Frames per second (fps) setting	10
5.3	Ambient, diffuse, specular, emissive	11
5.4	Mapping panel for a texture slot associated with an image.....	12
6	Installation.....	14
7	Export usage.....	15
8	IGS parameters selection	17
9	Notes about animation	17
10	Notes about smoothing.....	18
11	Notes about material.....	18
12	Warning about Asset Editor cache	20
13	Typical export errors or problems.....	20
13.1	No texture files found in asset editor or blueprint editor.....	20

13.2	The animation is working properly in Blender but not in the asset editor	20
13.3	The animation is stuttering.....	21
13.4	My igs configuration parameters are not working (transparency,...)	21
13.5	An object of an animated set is not in the expected rest position	21
13.6	Some objects disappear depending on the viewing angle or when getting closer	21
13.7	"Inconstant LODing" error or some objects are offset.....	22
13.8	Error "Malformed VFP at..."	22
14	Annexes.....	23
14.1	Shaders list.....	23
14.2	Shaders usage examples.....	28
14.3	Example of export with and without Hierarchy and CustomKeyWords.....	30
14.4	TS2013 naming rule check.....	34
14.5	Selection example for IA export	35
14.6	Automatic numbering	37
14.7	Example with TrainUprightViewFacingFlora.fx	40

1 Thanks

Thanks a lot to Mike Adams for his remarks and his tests of the exporter and, especially, the tests on animations!

2 Presentation

The exporter is made of 2 parts:

- IGS format export (model structure)
- IA format export (animation)

The principle to create an exportable model is as follows:

Name objects

An object must follow the TS2013 strict naming rules for LODs (see in 14.4).

If an object doesn't follow these rules, some processing is made to try to set the name as required by the game (see in 14.4).

Texture meshes

A material usually needs several texture slots. The first slot holds the shader name. The content of the other slots depends on the shader used (see in 5.1, 14.1, 14.2).

Adjust some pivots

Outside specific TS2013 or animations requirements, it is advisable to center the pivot of each object on its geometry.

Among the specific requirements of TS2103, the pivot of the main body of a car or locomotive must be centered with $z = 0$ at the rail contact (See example in 3.4). The bogie pivot must coincide with its rotation axis and the bogies naming convention must be followed with bo01 as the front bogie and bo02 as the back bogie, in the case of a rolling stock with 2 bogies.

In the game, some objects may disappear according to the viewing angle (see in 13.6 to solve this problem).

Setup material attributes in the Blender file and in an additional file

In Blender, you can enter short names or full shader names (See 5.1, 14.1). If short names are used, section [Materials: ShaderName] of file `IGS_ExpModFile.txt` is used to match the full name from the short name. An example of this file is included with the exporter package.

The existence of file `IGS_ExpModFile.txt` with non-empty content is checked before performing the export even when only using long shader names.

Note that a specific processing is performed for `TrainGlassWeatherEffects.fx` to make it more convenient to use (see 11).

Material attributes are initialized in Blender (see the 5.2, 5.3, 5.4) and by using an optional external file (see

3). This file is named with the root of the file name followed `_IGSExpModFile2.txt igs` or simply `IGSExpModFile2.txt`. For example, if you export `MyBeautifulModel.igs`, the file name must be `MyBeautifulModel_IGSExpModFile2.txt`. If this file is not found, `IGSExpModFile2.txt` is looked for. The log file indicates the file used for exporting.

Both files, `*IGSExpModFile2.txt` and `*IGS_ExpModFile.txt`, must in the same folder where the igs file is created.

Create animations (See in 4, 9)

Setup the behavior of the exporter (see in 3.4, 3.5, 7)

The exporter takes the modifiers into account without applying them to the model. Objects can also have some scaling and rotation (see some restrictions in 7 : it could be necessary to use Ctrl A to apply these transformations). Ngons can also be used.

If file `*IGSExpModFile2.txt` is found, as a default behavior, the Blender model hierarchy is kept only when objects use TS2012 keywords or when a LOD change is found. As much as possible, several Blender objects are merged into one object when exported, if they all have the same LOD value and distance.

If file `*IGSExpModFile2.txt` is missing, no merging is done and the objects hierarchy is not changed.

To merge objects, the exporter looks for keywords:

```
_locomotive', '_tender', '_coach', '_vehicle', '_wagon', '_carriage', '_coal', '_fuel_level_',
'_freight',
'_bulk', '_lights_fwdhead ', '_lights_revhead ', '_lights_fwddtail ', '_lights_revtdtail'
```

and those followed by digits:

```
'_door', '_step', '_wh', '_bo', '_panto', '_wiper', '_primarydigits_'
```

This limits the effect of TS2012 maximum of 256 exported objects and igs format limitation of a maximum of 24 children. However, as explained below, options are available to strictly follow the hierarchy and to ensure that specific sets of objects are merged together or not.

Instruction `CustomKeyWords` (see in 3.4) allows controlling the merging of objects.

Instruction `MainObject` (see in 3.4) sets the main object of the model, for example the body of a locomotive.

There are 2 modes of export for igs or ia: the entire model (whether objects are selected or not in Blender views) or selected objects.

Sample configuration files are provided with the released package.

Paragraph 13 lists typical export errors or problems.

Annexe 14.6 provides some information about using automatic numbering.

3 Configuration file for IGS export

3.1 Presentation

The following paragraphs explain the sections taken into account in file `*IGSExpModFile2.txt`.

3.2 UV arguments section

UV arguments (CUSTOMPARAM in GeoPxDx file)

This can be set in section [UVArguments], indicating 6 values separated with commas.

For example:

```
[UVArguments]
Glass01Mat=64.0, 0.8, 0.4, 0.0, 0.0, 0.0
```

means that CUSTOMPARAM0=64.0, CUSTOMPARAM1=0.8, etc.. for material named Glass01Mat.

The modification applies to the first render stage and therefore to the first material texture slot with a texture file (see “texture 1” in tables of paragraph 5.1). Default values are 0.0 for all CUSTOMPARAM.

3.3 Material attribute modification

Global material change:

Syntax	Default value
[Materials:AlphaTestMode]	0
[Materials:ZBias]	offset_z from Blender (0 by default)
[Materials:ZBufferMode]	1
[Materials:VisMod]	VisibleDistanceMod = 0
[Materials:TwoSided]	0
[Materials:BackfaceCull]	0
[Materials:Ambient]	Red, Green, Blue, Alpha = 1 If AnimateUVs non nul : Red, Green, Blue, Alpha = 0
[Materials:ViewFacing]	0 2 for a shader with "Upright" and "ViewFacing" in the name 1 for a shader with "ViewFacing" in the name and without "Upright"

Change which applies to the first render stage and therefore to the first material texture slot with a texture file (see “texture 1” in tables of paragraph 5.1):

Syntax	Default value
[Materials:FilterMode]	3
[Materials:AnimateUVs]	0
[Materials:NumFrames]	0
[Materials:FPS]	See 5.2

There should not be any use for other changes as default attribute parameters automatically set according to the shader name should be alright. Other material attributes can be modified in Blender (see paragraph 0).

The full material name is expected on the left part of the = sign.

For example:

```
[Materials:AlphaTestMode]
Ext01Mat=1
```

means that AlphaTestMode is set to 1 for material named Ext01Mat (see paragraph 11).

Note that for `Ambient`, all ambient red, green and blue values are set to the chosen value. It sets AmbientColor in the IGS file to be used then as AMBIENT in the GeoPcDx file.

3.4 Miscellaneous options

```
[Miscellaneous]
TargetTexturesDirectory=Textures
MainObject=1_1000_coach
Hierarchy=unchanged
CustomKeyWords=Bod, Seat, 1_0100_rod2
CenterMainObject=0,0,N
```

In this example, with the first instruction, textures files must be copied in a sub-directory named Textures, under the directory where the igs file must be in a TS2013 `Source` sub-directory.

When exporting the entire model, the second instruction (`MainObject`) tells to take `1_1000_coach` as the object which will be used to merge the other objects at the level under the scene object of the Blender model hierarchy.

If no `MainObject` is specified when exporting the entire model, the first mesh object found while scanning Blender objects is selected.

If no `MainObject` is specified when selected objects are exported, the first mesh object found while scanning the selected Blender objects is selected.

If the `Hierarchy` instruction is set to `unchanged`, the Blender hierarchy will be unchanged and less Blender objects will be merged together.

The `CustomKeyWords` instruction allows **controlling the merging of objects**, depending if you specify a full object name or a string common to different objects. In the above example, whether the `Hierarchy` option is present or not, **different groups of objects to merge separately** are defined: those with string `Bod` in the name, those with string `Seat` in the name. If you do not use `Hierarchy=unchanged` and if you do not want an animated object to be merged with other objects, unless they move with the same motion, just add its list full name to the list. Thus, `1_0100_rod2` present in the list `CustomKeyWords` will be **a single object, merged with any other object**.

An object named with a TS2013 keyword, as listed in paragraph 2, (for example `1_0100_bo01`) doesn't need to be in the `CustomKeyWords` list.

An example in Annex 14.3 shows the impact of options `Hierarchy` and `CustomKeyWords`.

In addition to `MainObject`, the `CenterMainObject` instruction can be used to **center or move the exported model** along the Blender X, Y or Z axis.

This avoids moving objects in Blender, for example, to center a locomotive along the X axis to ensure that it is centered on the rails.

Centering along an axis gives the same result as moving the entire model in Blender so that the pivot of the `MainObject` object is at coordinate 0 of this axis.

After `CenterMainObject`, separated by commas, initialize the three displacement values from the centered position for the different axis, following the order one value for the X-axis then one for the Y-axis and one for Z-axis.

Initializing to N (uppercase or lowercase), it indicates that no move should be performed for the corresponding axis.

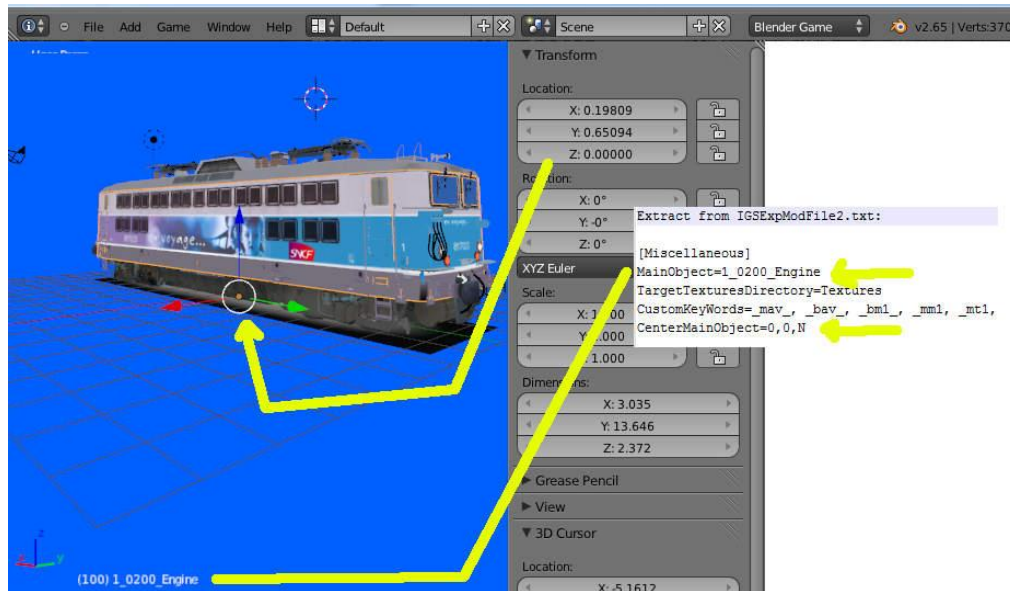
Spaces are ignored.

For example:

CenterMainObject Value	Move along X	Move along Y	Move along Z
Not in the igs file	None	None	None
CenterMainObject=0,0,N	Centered along X	Centered along Y	None
CenterMainObject=0.2,-6,4	Centered along X + translation by 0.2	Centered along Y - translation by 6.0	Centered along Z - translation by 4.0

As such a move impacts animations, the igs file settings of **CenterMainObject** and **MainObject** are also read when exporting IA.

Pivot example and use of **MainObject** and **CenterMainObject**:



The igs exporter log file indicates that the model was automatically centered:

INFO: Using CenterMainObject (0,0,N), exported model moved by X=-0.198090 Y=-0.650940 Z=-0.000000 (Blender axis)

3.5 Texture file names replacement

It is possible to replace upon export texture file names by adding anywhere in file `*IGSEXPModFile2.txt` the following sections :

```
[Textures:TextureName]
[Textures:TextureNameStringToReplace]
```

```
[Textures:TextureName]
```

allows replacing each listed file name by another name. The file suffix (ace, bmp, etc...) must not be specified.

```
[Textures:TextureNameStringToReplace]
```

allows replacing each listed chain string by another string, for all the texture files, after `[Textures:TextureName]` has been processed if such section is present.

In all cases, the letter case is not taken into account.

For example, with :

```
[Textures:TextureName]
CurrentName1=NewName1
CurrentName10=NewChain10
```

```
[Textures:TextureNamePart]
Chain1=Chain2
```

Texture file `CurrentName1` is exported as `NewName1`.

Texture file `CurrentName10` is translated into `NewChain10` (`[Textures:TextureName]` processing) and then exported as `CurrentChain20` (`[Textures: TextureNamePart]` processing).

4 Optional configuration file for IA export

In addition to the possible use of `CenterMainObject` (see previous paragraph), there is an optional configuration file with two possible parameters. For example:

```
[Miscellaneous]
FrameRateMultiplier=3
RemoveLastFrame=0
```

The file is named with the root name of the ia file followed by `_IAExpModFile2.txt` or just `IAExpModFile2.txt`.

4.1 FrameRateMultiplier

It allows having a frame rate higher than the fps value using parameter `FrameRateMultiplier`. The frame rate is computed as `FrameRateMultiplier * fps` value (see 5.2 for fps setting). The frame rate multiplier is limited to 10. If the computed frame rate is higher than 10, a message is displayed in the log file and `FrameRateMultiplier` is reset to 1 for the export.

For example, if the file is set with:

```
[Miscellaneous]
FrameRateMultiplier=3
```

With `fps = 30`, the frame rate for the animation will be 90. (This value can be found in the log file at line `SampleRate` in section `IAfHeaders`)

4.2 RemoveLastFrame

The IA file describes the positions of the IA elements through time. For a cyclic animation, the last position is identical to the first.

Eventually, removing this last position in the IA file, may make a cyclic animation smoother.

`RemoveLastFrame=0` or `RemoveLastFrame` missing in file `IAExpModFile2.txt` : Export done without any change.
`RemoveLastFrame` with any value positive, the last position is not exported.

For example, in file `IAExpModFile2.txt`, with:

```
[Miscellaneous]
RemoveLastFrame=1
```

the last position is not exported.

5 Additional configuration for IGS export

5.1 Texture slots mapping with TS2013 shaders

Blender exporter texture slot mapping			
Shader name or short shader name	Texture 1	Texture 2	Texture 3
Slot 1	Slot 2	Slot 3	Slot 4

Blender exporter texture slot mapping for TrainGlassWeatherEffects.fx				
Shader name or short shader name	Texture 1	Texture 2	Texture 3	Texture 4
Slot 1	Slot 2	(1)	Slot 3	Slot 4

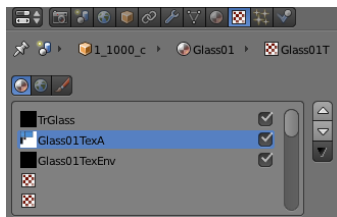
(1) Automatically processed by the exporter.

The first enabled slot is used for the shader name, whether it is the full name or the short one.

From `IGS_ExpModFile.txt`, only shader name mapping is taken into account (in section [Materials:ShaderName]).

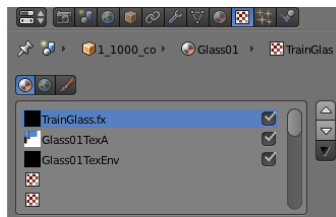
Some shaders usage examples are given in annex 14.2 and the shaders list is given in annex 14.1.

Example of slots setting:



(using the short name: TrGlass)

or

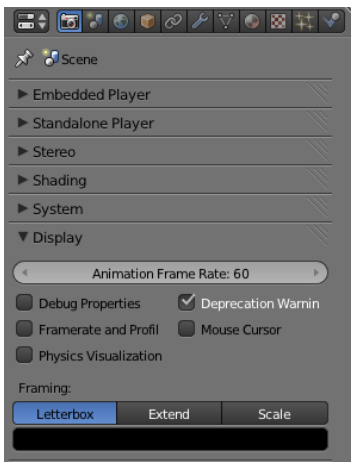


(using the long name: TrainGlass.fx)

The slots must be enabled (☒) to be taken into account. The enabled slots don't need to be contiguous. Only the enabled slots order matters.

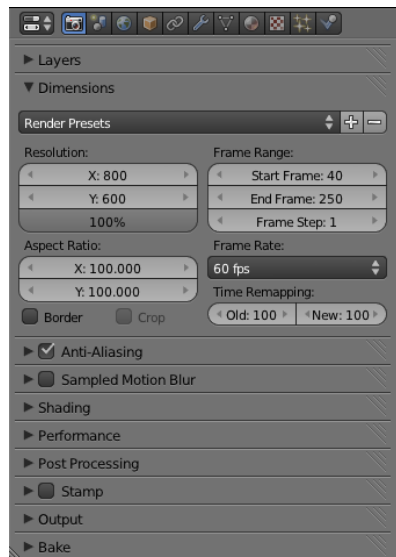
5.2 Frames per second (fps) setting

The frames per second (fps) can be set in the render menu:

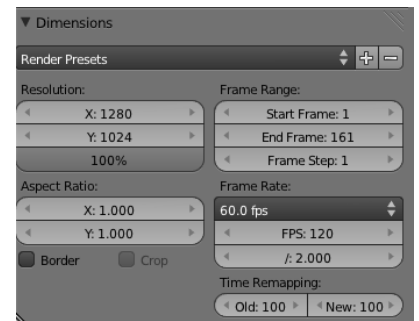


(If Blender game selected on top menu bar)

or



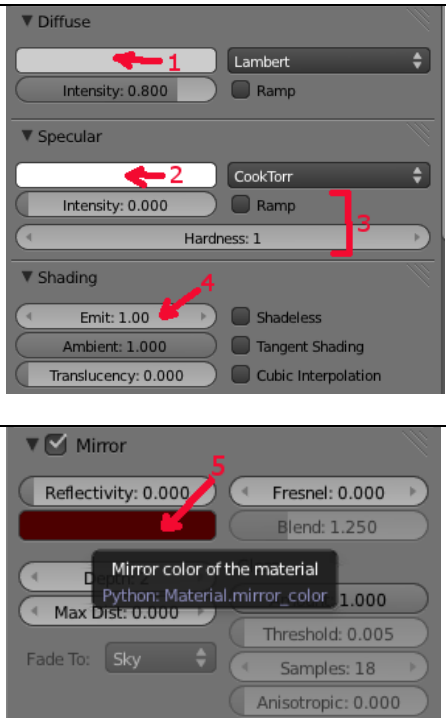
(If Blender render selected on top menu bar)



(If Blender render selected on top menu bar. Here it's $120 / 2 = 60$ fps which is taken into account. The divider (the framerate base) can be < 1)

5.3 Ambient, diffuse, specular, emissive

In the material menu, the following panels are used for these settings:

	Blender field	IGS field	GeoPcDx field
	1 Diffuse color 2 Specular color 3 Intensity * Hardness 4 Emit 5 Mirror color	DiffuseColor SpecularColor SpecularPower EmissiveStrength EmissiveColor	DIFFUSE SPECULARCOLOR SPECULARPOWER ? (not used?) EMISSIVE

Ambient is set in the file ending by IGSEXPModFile2.txt as shown in paragraph 3.3.

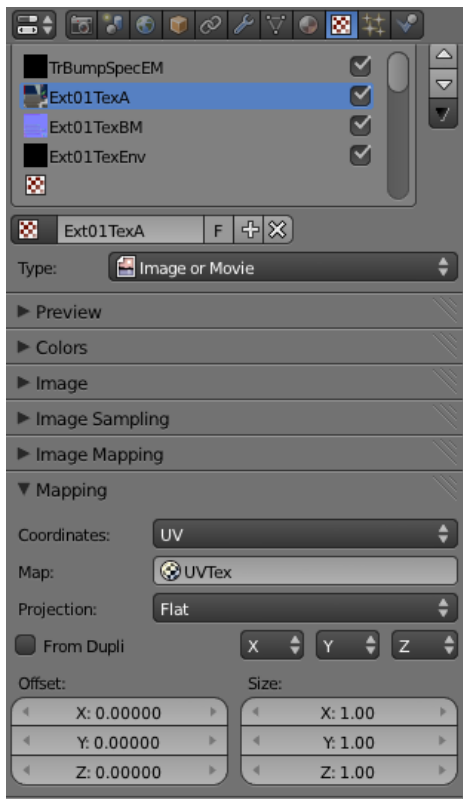
IGSEXPModFile2.txt	IGS field	GeoPcDx field
<pre>[Materials:Ambient] ... followed by the full material names list such as: Ext01Mat=0.5 Ext02Mat=0.5</pre>	AmbientColor	AMBIENT

The default value is 1.0.

UV arguments are set in the file ending by IGSEXPModFile2.txt as shown in paragraph 3.2.

5.4 Mapping panel for a texture slot associated with an image

Typical setting of the Mapping panel for a texture slot associated with an image:

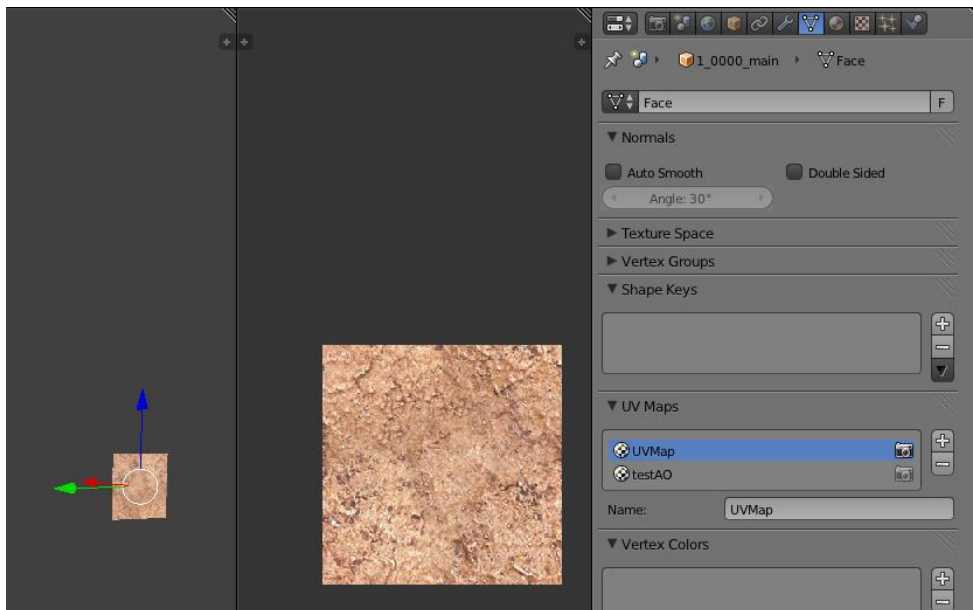


The “Map:” field may be empty when using the same UV mapping for all the texture slots.

Different mapping may be used for different texture slots of the same material.

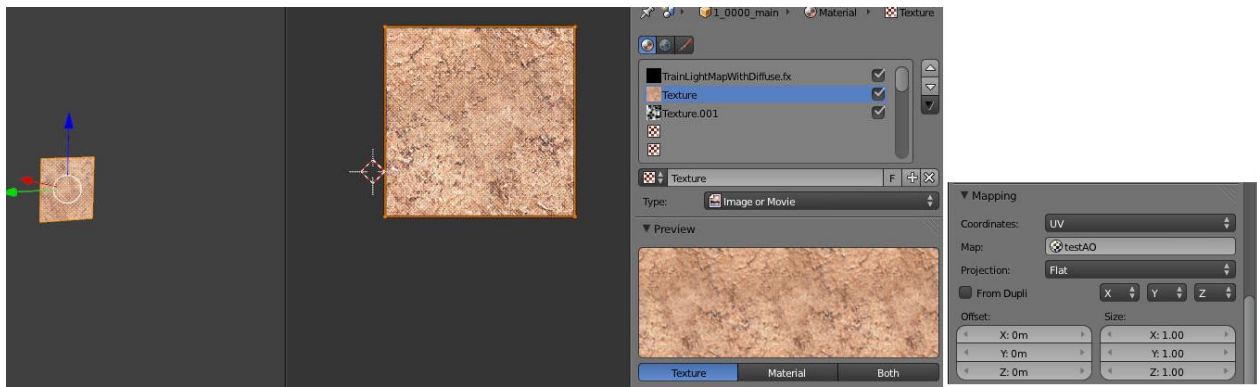
Here is such an example with shader `TrainLightMapWithDiffuse.fx` :

2 UV mapping are defined on this object:

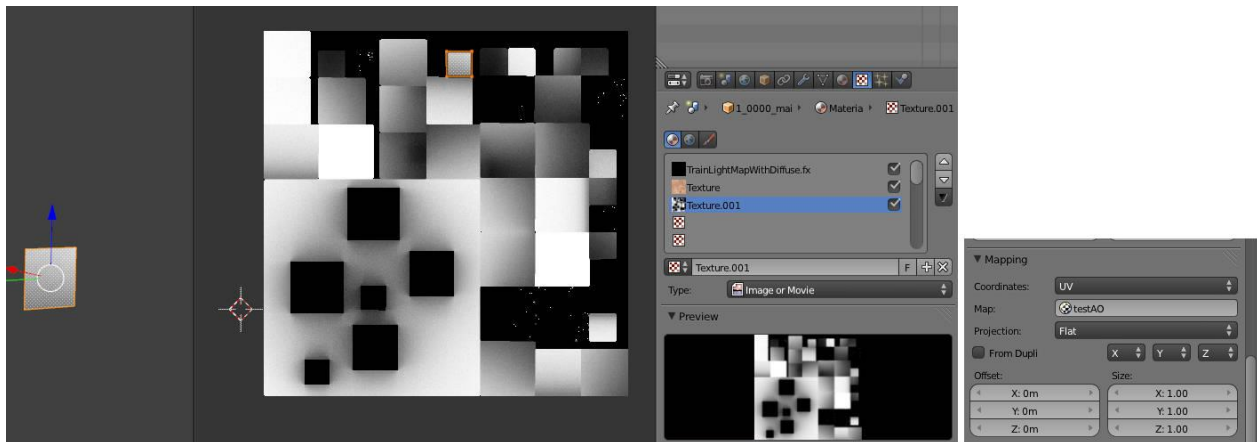


One for the main slot:

Blender 2.6x Train Simulator 20xx export – Documentation v1.13



... and one for the second slot ("lightmap" slot of TrainLightMapWithDiffuse.fx) :



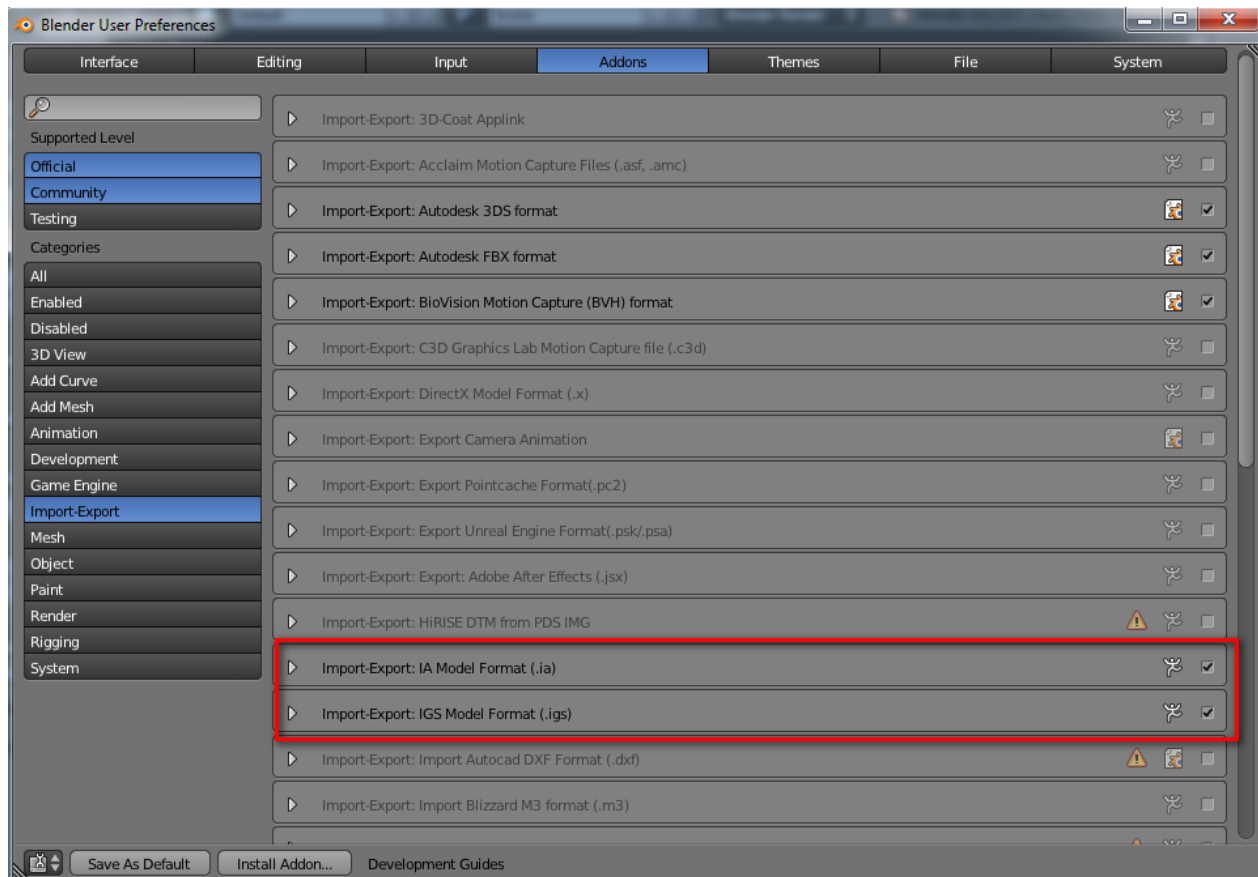
6 Installation

Install the igs and ia Add-Ons by simply copying files `io_export_igs.py` and `io_export_ia.py` in Blender “scripts\addons” sub-directory (for example: `D:\Program Files\Blender Foundation\Blender\2.63\scripts\addons`).

Start Blender to open the default Blender file.

The installed Add-Ons must be enabled before they can be used. Simply place a check mark on the Enable Add-On box of each Add-On. The new export functionality of the Add- Ons are now integrated into Blender and can be used.

For example:



For the Add-Ons to be enabled every time you start Blender, you will need to save your [User Preferences](#) (“Save as defaults” button).

7 Export usage

Annex 14.3 shows the impact of options `Hierarchy` and `CustomKeyWords` on IGS and IA export.

For igs export:

Objects with LOD ≥ 2 must not have a scale modification. Apply Ctrl A “scale” to these objects.

The use of negative scaling may sometimes require applying Ctrl A “scale”.

The export is done setting, during the export, “current frame” to 0. The different animated objects must be in a rest position for “current frame” = 0. At the end of the export, “current frame” is reset to the value before performing the export.

Don’t forget to have a properly named and configured file named `IGS_ExpModFile.txt` and, optionally, one named or ending with `IGSExpModFile2.txt` (see paragraph 2).

Make sure that texture slots are properly enabled for each material.

Select in the File menu: Export -> TS20xx IGS

A new window is displayed to allow for igs file name and directory selection.

On the left, 4 options can be changed:

- “Use selection”, to only export the selected objects or the entire model.

If unchecked (default value), the parent visible objects from the entire model and their children, according to the “Visible children” option, are exported. In the outliner, the eye icon in front each object is not greyed out for a visible object.

If checked, selected objects are exported whether they are visible or not. Their children are processed according to the “Visible children” option. Don’t select an object if some parent in the hierarchy is already selected.

The processed objects are of type `Mesh` and `Empty`. An `Empty` can be used to group its children objects.

- “Visible children”, to only export the visible children. If it’s not checked (default value), all children are exported whether they are visible or not.
- “Optimized IGS”, to export a smaller IGS file. This is done by storing only once points shared by different faces of the same object. This increases the export time (it can be very long with a lot of complex objects and with modifiers such as mirror or array).

Whether the option is checked or not, the rendering looks identical in TS20xx. One possibility is to uncheck the option throughout the development of a model and to check it for the final export.

This option is mandatory with shaders `TrainUprightViewFacingFlora.fx` and `TrainViewFacingFlora.fx`.

- “Verbose”, to have a short or a detailed log file. The log file is suffixed by “.log” and has the same root name as the exported igs file.

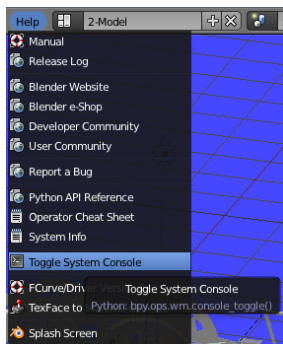
Once the export is done, check the console and the log file. If the igs file is not found, an error occurred during the export process. Even without any error, check specifically for:

- Messages about substitutions between short texture names and long names. If the first slot of a material (shader name) is wrong, it's likely that no substitution is done and the message ending with "shader short name used as the long shader name" will display a wrong shader name.
- If you use parameters from the file named or ending with `IGSExpModFile2.txt`, make sure there is no message telling that the file was not found.
- The objects groups list starting with "----- Groups list -----". It can be checked that objects are grouped as expected.
- Material parameters taken into account from the configuration file `*IGSExpModFile2.txt` (Ambient, UVArguments, etc...)

The short log file allows displaying the following information:

- **Materials list** with associated shader, first texture and UVArguments parameters.
- **The attributes of each material** (shader, ambient, diffuse, AlphaTestMode, UVArguments, FPS, etc...)
- The **texture files list**

To display the Blender console, select the following menus:



For ia export:

The animated objects must not use a scaling transformation. Apply to the objects Ctrl A "rotation & scale".

Select in the File menu: Export -> TS20xx IA

As for the IGS export, the same "Use selection", "Visible children" and "Verbose" options are available but "Use selection" is checked as a default option. With this option, the selected objects, visible or not, and their children, according to the "Visible children" option, are studied when exporting the animation.

Usually animation export is not based on the entire model but on model parts (wipers, pantographs, etc..).

However, if "Use selection" is not checked, make sure all objects needed in the animation are visible, including armatures and lattices (In the outliner, the eye icon in front each object is not greyed out).

It is not necessary to select all objects of an animation set and especially an object with an already selected parent.

Among the selected objects (option "Use selection" checked) or the objects below the scene object, the criteria of inclusion in the animation export are (see example at 14.5):

- They have a constraint or an animation.
- They are direct parent of an armature.
- They have a child (parentage created with Ctrl p) with a constraint or an animation.

When using the "Use selection" option, be sure that the **selection is consistent with the igs** structure. For example, if the igs file was created exporting the entire model, the selected objects for animation should be at the level under the scene object (otherwise, risk of unwanted translation when playing the animation).

By default, the log file lists the selected objects and those taken into account in the export.

8 IGS parameters selection

On a small model, the safest is to use the instruction `Hierarchy=unchanged`.

However, to avoid reaching TS2013 maximum number of objects and the children number limit, my preference is to export without keyword `Hierarchy`. **Then check the objects lists in the log file. If some objects with some animation have been merged**, list them after the `CustomKeyWords` keyword (see 3.4) and execute the exports again.

9 Notes about animation

The exporter processes active animations at the time of the export file saving.

Thus, if, for example, a constraint is disabled in the open model, it will not be in the exported animation.

In short, the animation working in the Blender 3D view should be the one played in TS2013, provided all the objects selection is correct ("Use selection" checked) or all the objects needed for the animation are visible ("Use selection" unchecked).

Don't forget to set the frames per second (fps), the **start and end keyframes** according to the relevant objects: a switch animation is shorter than a pantograph animation.

Data in exported IA format are displacements and rotations. There is therefore no scale. Thus the effect of a "copy scale" constraint won't show up in the TS2013 exported animation.

A model and tutorial on "animating the valve-gear of a steam locomotive" by Mike Adams can be found on ukrainsim download section. Though this tutorial is being updated for this export tool, it gives a good example of what can handle the exporter: lattices, bones, armatures, constraints of type copy location / copy rotation, limit rotation.

It is likely that one Blender file will **have several unrelated animations**, such as, for example, wipers and doors. These different animations can all start at keyframe 0. However when animation is played in Blender all the animations in a specified keyframes range will animate. This is no problem for the export as, once the keyframes range is set, you'll only select, in this example, the wipers objects to export the wipers animation and the other moving object will not be included. **If you prefer independent animations in the Blender file**, you can use different keyframes range. For example, a wiper animation between keyframes 0 and 100, a door animation between 120 and 200, etc.. To export the door animation, select the related parent objects and set the keyframes range between 120 and 200.

The dope sheet or the graph editor allows to easily move keyframes if necessary.

10 Notes about smoothing

The exporter takes into account whether to render the object fully smoothed, flat or smoothed above a given angle.

You can read details on smoothing here:

<http://wiki.blender.org/index.php/Doc:2.6/Manual/Modeling/Meshes/Smoothing>

I use below some information from this link for a few explanations.

The easiest way is to set an entire object as smooth or faceted by selecting a mesh object, and in Object mode click **Smooth** in the Tool Shelf. This button does not stay pressed; it forces the assignment of the “smoothing” attribute to each face in the selected mesh.

Click the **Flat** button in the Tool Shelf's Shading panel to cancel the smoothing effect.

Object Tools

Transform:

Translate

Rotate

Scale

Origin

Object:

Duplicate

Delete

Join

Shading:

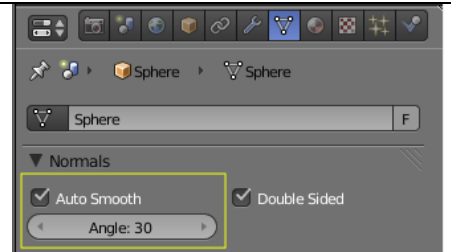
Smooth

Flat

Auto smoothing can be enabled in the mesh's panel in the Properties window. Angles on the model that are smaller than the angle specified in the Angle button will be smoothed for the export and during rendering (i.e. not in the 3D view) when that part of the mesh is set to smooth (i.e. **Smooth** was also clicked). Higher values will produce smoother faces, while the lowest setting will look identical to a mesh that has been set completely solid.

When auto smoothing is used, please note that the processing time of the export is slightly increased.

Another way of changing the impact if smoothing is to use the **edge split modifier**.

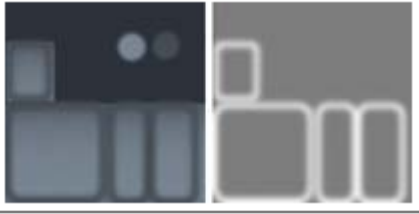
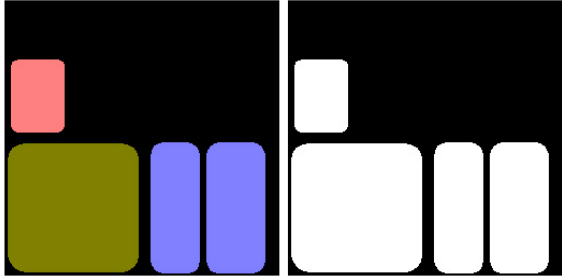



11 Notes about material

`TrainBasicObjectDiffuse.fx` can be used with transparency in the alpha channel provided it's only black (full transparency) or white (no transparency). For the transparency to be active, `AlphaTestMode` must be set to 1 in the file ending with `IGSEExpModFile2.txt`.

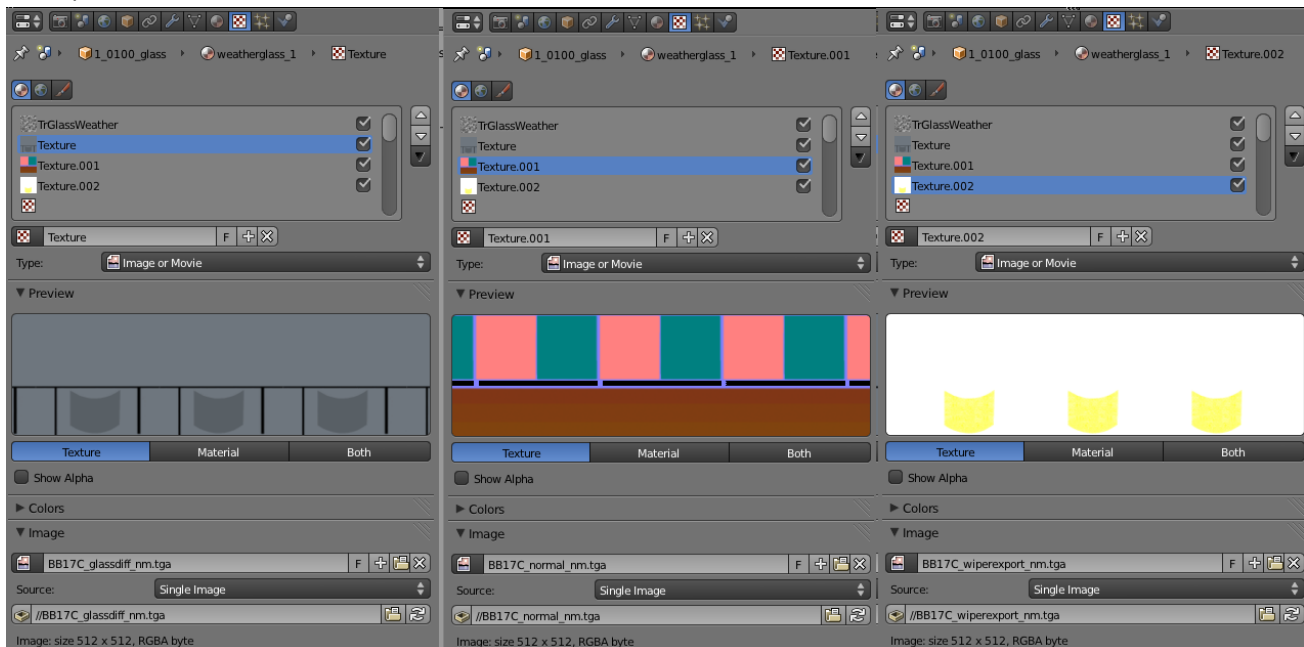
Viewfacing value is automatically set to 2 for a shader with "Upright" and "ViewFacing" in the name (`TrainUprightViewFacingFlora.fx`) and Viewfacing value is automatically set to 1 for a shader with "ViewFacing" in the name and without "Upright" (`TrainViewFacingFlora.fx`). An invisible object must be added otherwise the object once added in a scenario won't be pickable. One way is to add a cube textured with the tree texture file and use "invisible" as the shader. The "invisible" shader must be accompanied by a texture file that is not used but it is necessary for the export (see example 14.7).

`TrainGlassWeatherEffects.fx` is processed by the exporter. The material name with such shader must be **weatherglass_1** then **weatherglass_2**, etc... (According to the number of materials using this shader) In addition to the **shader name slot**, you only need to have **3 slots** with the useful texture files (The texture filenames is the user choice. The 3 images below are from http://www.christrains.com/TS2013_faq_weatherglass.html) :

windiff_nm.tga : Main texture with alpha channel.	
winnorm_nm.tga : normal map texture to define where the raindrops are.	 <div> <p>R=128 G=128 B=255 FRONT WINDOWS</p> <p>R=128 G=128 B=0 BACK WINDOWS</p> <p>R=0 G=128 B=128 LEFT SIDE WINDOWS</p> <p>R=255 G=128 B=128 RIGHT SIDE WINDOWS</p> </div> <p>Diffuse (left) and alpha (middle) channels for slot 3. RGB Colours (right) for window directions</p>
winwmotion_nm.tga : Texture to define the wipe out pattern of raindrops.	

For `TrainGlassWeatherEffects.fx`, the exporter automatically adds an additional slot for TS2013.

Example in Blender:



See also some shader usages in annex 14.2.

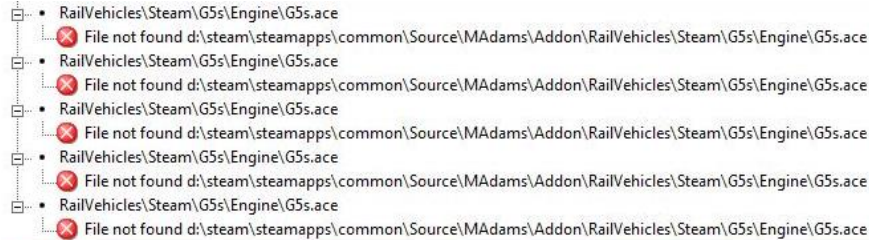
12 Warning about Asset Editor cache

When exporting the **ia animation** trying different parameters, it's better to exit the Asset Editor, **clean the cache** and restart the Asset Editor. Otherwise, the Asset Editor might not update the animation properly.

13 Typical export errors or problems

13.1 No texture files found in asset editor or blueprint editor

If no texture files are found when opening the xml model file in the asset editor or the blueprint editor



... check in the log file that the export used the proper `*IGSEXPModFile2.txt` file and that parameter `TargetTexturesDirectory` is properly set.

13.2 The animation is working properly in Blender but not in the asset editor

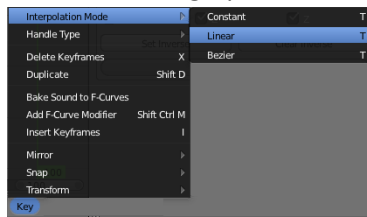
If nothing moves, check in the main blueprint “Anim Set” section that all the animation sets have “Animate in editor” set to “True”.

If the parts are not moving as expected:

- **Check the igs / ia export consistency.** For example, selected objects for animation are not under the scene level whereas the igs export was made for the entire model (no selection).
- **Check in the igs export log file (“Groups list” section) that a moving part was not merged with another object.** If this is the case, add the part in the `CustomKeywords` section of file `*IGSEXPModFile2.txt` or, if the model has not too many objects, use `Hierarchy=unchanged`.
- **Check the FPS value** (number of frames per second) in the igs exporter log file. This value is listed in every description of a material even if option "verbose" is not checked. Setting-up FPS is explained in paragraph 5.2.
- Exit the Asset Editor, **clean the cache** and restart the Asset Editor

13.3 The animation is stuttering

If you can't get a smooth animation, try "Key" menu -> "Interpolation Mode" -> "Linear", either in the dope sheet or in the graph editor.



You can also try to lower the framerate divider (framerate base: see 5.2) or try to use an `IAExpModFile2.txt` file: see paragraph 4.

13.4 My igs configuration parameters are not working (transparency,...)

Check the beginning of the igs log file:

- A message starting with "`>>>> INFO:`" tells which "`*IGSExpModFile2.txt`" file was used. Check that your file has a "2" before the txt suffix.
- Then, check its contents listed afterwards: Are the expected IGS parameters listed?
- For transparency, you may need to use instructions like `ZBufferMode=3` or `AlphaTestMode=1` according to the shader used (see paragraph 14.2).

13.5 An object of an animated set is not in the expected rest position

An object of an animated set may not be in the expected position before running the animation. Still, when running the animation and when the set returns to the rest position, all objects of the animated set are well positioned.

To fix this problem:

- Check the object position with current frame set to 0 (the igs export is done with "current frame" = 0).
- Before animating an object, ensure to use Ctrl A "rotation & scale".
- If the badly positioned object is a child, clear the parent link (Alt P + Clear and Keep Transformation). Add the link with the parent using the ChildOf constraint + Set Inverse. Don't forget to export again the igs file. The object must then be included in the selection when exporting the animation.

13.6 Some objects disappear depending on the viewing angle or when getting closer

Some objects disappear in TS2013 when getting close if the pivot is "far" away. This problem is not specific to the Blender exporter.

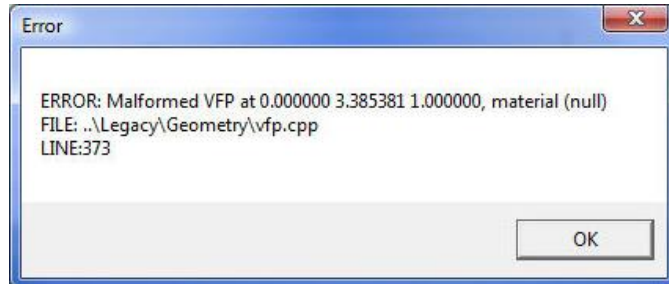
One solution is that the disappearing objects have their own pivot, close to the group center, grouping the objects with a custom key word (CustomKeyWords in file `*IGSExpModFile2.txt`).

13.7 "Inconstent LODing" error or some objects are offset

Check that:

- An object of LOD level N has a parent of LOD N-1 (parentage created by Ctrl p).
- The child name must be the same as the parent name, apart from the LOD level and distance
- The child LOD distance must be > than the parent LOD distance

13.8 Error "Malformed VFP at..."



Check option " Optimized IGS".

14 Annexes

14.1 Shaders list

non fx shader					
Shader name (non fx)	Short name	Description	Texture 1	Texture 2	Texture 3
AddAlphaDiff	AddAlphaDiff	No texture, additive vertex alpha with diffuse colour.	none	none	none
AddATex	AddATex	Texture mapped, no lighting applied, using additive alpha from texture's alpha channel	RGB: Colour A: Transp.	none	none
AddTexAlphaDiff		Texture mapped, with diffuse colour, using additive alpha from texture's alpha channel combined with vertex alpha			
BlendATexDiff	BlendATexDiff	Texture mapped, with diffuse colour, using additive alpha from texture's alpha channel	RGB: Colour A: Transp.	none	none
AddDiffuse		No texture, with diffuse colour, using additive alpha			
AddTex	AddTex	Texture mapped, no lighting applied, using additive alpha Useful for headlight or rearlight glass.	RGB: Colour	none	none
AddTexAlphaDiff		Texture mapped, with diffuse colour, with additive vertex alpha			
AddTexDiff		Texture mapped, with diffuse colour, using additive alpha			
BlendAlphaDiff		No texture, vertex alpha blending with diffuse colour			
BlendATex		Texture mapped, no lighting applied, using alpha blending from texture's alpha channel			
BlendATexAlphaDiff		Texture mapped, with diffuse colour, using alpha blending from texture's alpha channel combined with vertex alpha			
BlendATexDiffTrans		Texture mapped, diffuse colour, alpha blending from texture's alpha channel, pixels with alpha=0 are transparent (e.g. alphaed fences).			
BlendTexAlphaDiff		Texture mapped, with diffuse colour, with vertex alpha blending			
BridgeSplit		Not drawn. Use to define areas where track crosses over itself.			
Diffuse		No texture, just diffuse colour			
DualAddATexDiffDestBlend		Dual textured, diffuse colour, first pass additive, and second pass blended alpha with the alpha of the first texture (e.g. puddles).			
DualBlendATexDiffAdd		Dual textured, with diffuse colour, using alpha blending for first pass and additive alpha for second pass			
DualTexDiffAdd		Dual textured, with diffuse colour, using additive alpha for second texture			
DualTexDiffAddWithLightIntens		Add second pass to first pass, brightness of second pass affected by lightmaps if used			
DualTexDiffAddWithoutLightIntens		Add second pass to first pass, brightness of second pass not affected by lightmaps if used			
DualTexDiffInvisibleStencilBlend		Dual textured, with diffuse colour, first pass invisible, second pass alphaed using alpha of first pass texture			
DualTexDiffStencilAdd		Dual textured, with diffuse colour, using additive alpha for second texture only where first texture has solid alpha			
DualTexDiffStencilBlend		Dual textured, with diffuse colour, using blended alpha for second texture only where first texture has solid alpha			

non fx shader					
Shader name (non fx)	Short name	Description	Texture 1	Texture 2	Texture 3
DualTexDiffTAlpha		Dual textured, with diffuse colour, using second texture's alpha channel to blend between textures			
DualTexDiffTrans		Dual textured, with diffuse colour, using second texture's transparency			
DualTexDiffVAlpha		Dual textured, with diffuse colour, using vertex alpha to blend between textures			
EmbossBumpmap		Bumpmap for Train 2 prototype or something like that			
Invisible		Nothing is drawn - use for invisible collision barriers			
Tex	Tex	Texture mapped, no lighting applied	RGB: Colour	none	none
TexDiff	TexDiff	Texture mapped with single texture, diffuse colour applied	RGB: Colour	none	none
TripleGlossMap		Triple texture, 2nd pass contains gloss map in alpha channel, 3rd pass (reflection) texture drawn additively			
TripleGlossMapWithLightIntens		Triple texture, 2nd pass alpha channel gloss map, 3rd pass drawn additively affected by lightmaps if used			
TripleGlossMapWithoutLightIntens		Triple texture, 2nd pass alpha channel gloss map, 3rd pass drawn additively not affected by lightmaps if used			
TripleTexDiffAddAdd		Triple textured, 2nd and 3rd passes are drawn additively			
TripleTexDiffTAlpha		Triple textured, with diffuse colour, using each texture's alpha channels to blend between each pair of passes			
TripleTexDiffTAlphaVAlpha		Triple textured, with diffuse colour, pass 2 uses texture alpha for blending, pass 3 uses vertex alpha for blending			
TripleTexDiffVAlpha		Triple textured, with diffuse colour, using same vertex alpha to blend between each pair of passes			
TripleTexDiffVAlphaTAlpha		Triple textured, with diffuse colour, pass 2 uses vertex alpha for blending, pass 3 uses texture alpha for blending			

fx shader					
shader name (fx)	Short name	Description	Texture 1	Texture 2	Texture 3
TrainEnv.fx	TrEnv		RGB: Colour	RGB: Dummy	none
LoftTexDiff.fx	LoftTexDiff		RGB: Colour	none	none
LoftTexDiffTrans.fx	LoftTexDiffTr		RGB: Colour A: Transp.	none	none
LoftBump.fx		Diffuse texture and normal map			
LoftBumpAlpha.fx		Diffuse texture with alpha and normal map			
LoftBumpTrans.fx		Diffuse texture with 1-bit alpha and normal map			
SkinAmbient.fx		Single colour skinned			
SkinDiffuse.fx	Skin	Textured skinned.	RGB: Colour A: Transp.	none	none
SkinGloss.fx		Textured, normal mapped, specular with gloss map, and skinned.	RGB: Colour	RGB: Normal Map	RGB: Gloss Map
SkinNormal.fx		Textured, normal mapped, specular and skinned.	RGB: Colour	RGB: Normal Map	none
SkinSpecular.fx		Textured, specular and skinned.	RGB: Colour	none	none
StencilShadow.fx	Shadow	Stencil shadow objects, material must begin with shadow_ to be detected. Not used anymore in TS2013 with TSX mode.	RGB: Colour	none	none
TrainBasicObjectDiffuse.fx	TrDiff	Single texture, dynamic lighting.	RGB: Colour	none	none
		Diffuse texture + black and white (no grey) alpha channel . Set keyword AlphaTestMode to 1 for the alpha channel to be used. Can be used for inscriptions.	RGB: Colour A: Transp.	none	none
TrainBasicObjectSpecular.fx	TrSpec	Texture, colour modulated specular.	RGB: Colour A: Transp.	RGB: Spec color map	none
TrainBumpEnv.fx		Textured, normal mapped, environment mapped.	RGB: Colour	RGB Normal Map	RGB: Dummy (Cubic Env)
TrainBumpEnvMask.fx		Textured, normal mapped, masked environment map.	RGB: Colour A: Env Mask	RGB: Normal map	RGB: Dummy (Cubic Env)
TrainBumpSpec.fx	TrBumpSpec	Textured, normal mapped, specular.	RGB: Colour A: Transp.	none	none
TrainBumpSpecEnv.fx	TrBumpSpecEM	Textured, normal mapped, environment map and specular.	RGB: Colour	RGB Normal Map	RGB: Dummy (Cubic Env)
TrainBumpSpecEnvMask.fx		Textured, normal mapped, masked environment map and specular.	RGB: Colour A: Env & Spec Mask	RGB: Normal map	RGB: Dummy (Cubic Env)

fx shader					
shader name (fx)	Short name	Description	Texture 1	Texture 2	Texture 3
TrainBumpSpecMask.fx		Textured, normal mapped, masked specular.	RGB: Colour A: Env Mask	RGB: Normal map	none
TrainDecal.fx		Diffuse texture + 8 bit alpha channel for transparency. For the alpha channel any level of grey can be used from black to white. Set keyword ZBufferMode to 3 for the alpha channel to be processed properly. The texture file name must start with decal. Best choice for inscriptions.	RGB: Colour A: Transp.	none	none
TrainFlora.fx	TrFlora	Ambient lighting, single texture.	RGB: Colour	none	none
TrainGlass.fx		Screen space refractive glass with normal map and diffuse.	RGB: Colour	RGB: Normal map	Back buffer copy
TrainGlassWeatherEffects.fx		See specific table below.			
TrainLightMapWithDiffuse.fx	TrLightMap	Diffuse tex, lightmap, dynamic lighting.	RGB: Colour	RGB Lightmap	none
TrainLightBumpSpecMask.fx		Diffuse tex, normal map, Ambient Occlusion map.	RGB: Colour	RGB: Normal map	RGB: Occlusion map
TrainSkyDome.fx	Sky	Skydome	RGB: Colour	RGB: Dummy (Cubic Env)	none
TrainSpecEnv.fx		Textured, vertex environment mapped with specular.	RGB: Colour	RGB: Dummy (Cubic Env)	none
TrainSpecEnvMask.fx	TrSpecEM	Textured, masked vertex environment mapped with specular.	RGB: Colour A: Env & Spec Mask	RGB: Dummy (Cubic Env)	none
TrainUprightViewFacingFlora.fx	TrUpVFaceFlora	Single texture, globally lit, upright view facing	RGB: Colour A: Transp.	none	none
TrainVertexLit.fx		Diffuse tex, vertex lighting only.	RGB: Colour	none	none
TrainVertexLitWithDiffuse.fx		Diffuse tex, vertex lighting, dynamic lighting.	RGB: Colour	none	none
TrainViewFacingFlora.fx	TrVFaceFlora	Single texture, globally lit, view facing	RGB: Colour A: Transp.	none	none
WaterCubeMap.fx	Water	Splish	RGB: Colour A: Transp.	RGB: Normal map	none
TrainBumpEnv.fx		Textured, vertex environment mapped.	RGB: Colour	RGB: Dummy (Cubic Env)	none
TrainBumpEnvMask.fx		Textured, masked vertex environment map.	RGB: Colour A: Env. Mask	RGB: Dummy (Cubic Env)	none

fx shader						
shader name (fx)	Short name	Description	Texture 1	Texture 2	Texture 3	Texture 4
TrainGlassWeatherEffects.fx	TrGlassWeather	Reflective glass with cubic reflection map and diffuse.	RGB Diffuse A Translucency	Cubic environment map	Normal texture placeholder	Backbuffer placeholder

14.2 Shaders usage examples

	Shader name (texture slot 1)	Main texture (= "texture 1". In texture slot 2)	Bump map	Environment map ⁽¹⁾	Additional settings
Solid texture	TrainBasicObjectDiffuse.fx	name.bmp			
Solid texture with holes	TrainBasicObjectDiffuse.fx	name.tga (transparency in alpha channel. Only black or white)			AlphaTestMode=1 (needed for the alpha channel to be processed as a transparent layer)
Solid texture with holes (for inscriptions such as rolling stock numbers)	TrainDecal.fx	decal_name.tga (transparence in alpha channel: any grey value between black and white)			ZBufferMode=3 (needed for the alpha channel to be properly processed as a transparent layer)
Texture with specular effects ⁽³⁾	TrainSpecEnvMask.fx	name.tga (specular in alpha channel)		env.bmp (slot 3)	
Texture with specular effects and normal maps ⁽³⁾	TrainBumpSpecEnvMask.fx	name.tga (specular in alpha channel)	name_nm.bmp (slot 3)	env.bmp (slot 4)	<u>UV arguments suggested values:</u> ⁽²⁾ CUSTOMPARAM0=32.0 (all other values = 0.0)
Windows only	TrainGlass.fx	name.tga (transparency in alpha channel)		env.bmp (slot 3)	<u>UV arguments suggested values:</u> ⁽²⁾ CUSTOMPARAM0=64 CUSTOMPARAM1=0.8 CUSTOMPARAM2=0.4 (all other values = 0.0)
Windows only	BlendATexDiff	name.tga (transparency in alpha channel)			ZBufferMode = 3 (needed for the alpha channel to be processed as a transparent layer)
Headlight or rearlight glass	AddATex	name.tga (transparency in alpha channel)			ZBufferMode = 3 (needed for the alpha channel to be processed as a transparent layer)
2D Vegetation	TrainUprightViewFacingFlora.fx ou TrainViewFacingFlora.fx	name.tga (transparency in alpha channel. Only black or white)			AlphaTestMode=1 (needed for the alpha channel to be processed as a transparent layer) "Optimized IGS" must be checked.
Animated texture http://railsimilarity.blogspot.fr/2009/01/how-toanimate-textures.html	AddATex	name_anim1.tga which is the first file of the animation.			AnimateUVs=1 NumFrames and FPS according to the animation to implement.

Notes:

(1)

Environment map is usually a 64x64 dummy black bmp file. It can be the same as the primary texture. Used for shaders named *EnvMask.fx

(2)

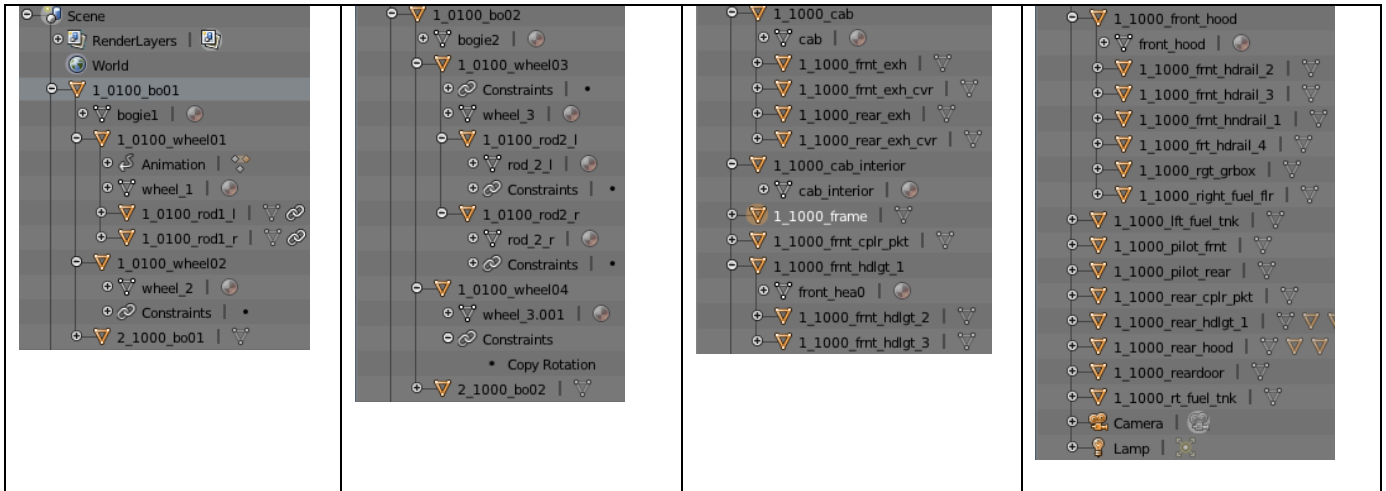
CUSTOMPARAM0 = specular exponent (between 0 and 64)

CUSTOMPARAM1 = reflection intensity (day)

CUSTOMPARAM2 = reflection illumination (night)

(3) Train Simulator "specular map" is an alpha map of the main texture blended with the environment map.

14.3 Example of export with and without Hierarchy and CustomKeywords



Note: CustomKeywords in this example show how objects are merged and how it can also be used to ensure that an object is not merged with others by adding the full object name (see paragraph also 3.4).

For this example, the wheels don't follow the TS2013 naming rules (bo01wh01, for example). They are processed as any object. With the TS2013 naming rules, it would not have been necessary to add them in the CustomKeywords list (see choices 3 and 4 below).

This model needs to animate wheels and rods. So choice 1 is not the right option as wheels and rods are merged. Choice 4 is the best if you need to add a lot more objects in the model and don't want to reach the 256 objects limit.

IA Export: To export the wheels and rods animation, select 1_0100_bo01 and 1_0100_bo02.

Choice 1: IGS export with:

```
[Miscellaneous]
MainObject=1_0100_frame
----- Groups list -----
--- 5 groups ---

--- Group --- 1_1000_frame (34 items)
LOD level 1 / LOD distance 1000 / keyword None
Parent group: None
Group objects:
    1_1000_frame
    1_1000_cab_interior
    1_1000_rear_cplr_pkt
    1_1000_frmnt_cplr_pkt
    1_1000_lft_fuel_tnk
    1_1000_rt_fuel_tnk
    1_1000_pilot_frmnt
    1_1000_pilot_rear
    1_1000_cab
    1_1000_frmnt_exh
    1_1000_frmnt_exh_cvr
    1_1000_rear_exh
    1_1000_rear_exh_cvr
    1_1000_rear_hood
    1_1000_hdrail_rear_3
    1_1000_hdrail_rear_4
    1_1000_left_fuel_fldr
    1_1000_lft_gearbx
    1_1000_rear_hdrail_1
    1_1000_rear_hdrail_2
    1_1000_reardoor
    1_1000_rear_hdlgt_1
    1_1000_rear_hdlgt_2
    1_1000_rear_hdlgt_3
    1_1000_front_hood
    1_1000_frmnt_hdrail_2
    1_1000_frmnt_hdrail_3
    1_1000_frmnt_hdrail_1
    1_1000_frmnt_hdrail_4
    1_1000_rgt_grbox
    1_1000_right_fuel_fldr
    1_1000_frmnt_hdlgt_1
    1_1000_frmnt_hdlgt_2
    1_1000_frmnt_hdlgt_3

--- Group --- 1_0100_bo02 (5 items)
LOD level 1 / LOD distance 0100 / keyword _bo02
Parent group: None
Group objects:
    1_0100_bo02
    1_0100_wheel103
    1_0100_rod2_1
    1_0100_rod2_r
    1_0100_wheel104
Group children:
    2_1000_bo02

--- Group --- 2_1000_bo02 (1 item)
LOD level 2 / LOD distance 1000 / keyword _bo02
Parent group: 1_0100_bo02
Group objects:
    2_1000_bo02

--- Group --- 1_0100_bo01 (5 items)
LOD level 1 / LOD distance 0100 / keyword _bo01
Parent group: None
Group objects:
    1_0100_bo01
    1_0100_wheel101
    1_0100_rod1_1
    1_0100_rod1_r
    1_0100_wheel102
Group children:
    2_1000_bo01

--- Group --- 2_1000_bo01 (1 item)
LOD level 2 / LOD distance 1000 / keyword _bo01
Parent group: 1_0100_bo01
Group objects:
    2_1000_bo01
```


Choice 2: IGS export with:

```
[Miscellaneous]
MainObject=1_0100_frame
Hierarchy=unchanged
```

<p>--- 46 groups ---</p> <p>--- Group --- 1_1000_frame (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_frame</p> <p>--- Group --- 1_0100_bo02 (1 item) LOD level 1 / LOD distance 0100 / keyword None Parent group: None Group objects: 1_0100_bo02</p> <p>Group children: 1_0100_wheel03 1_0100_wheel04 2_1000_bo02</p> <p>--- Group --- 1_0100_wheel03 (1 item) LOD level 1 / LOD distance 0100 / keyword None Parent group: 1_0100_bo02 Group objects: 1_0100_wheel03</p> <p>Group children: 1_0100_r0d2_1 1_0100_r0d2_f</p> <p>--- Group --- 1_0100_r0d2_1 (1 item) LOD level 1 / LOD distance 0100 / keyword None Parent group: 1_0100_wheel03 Group objects: 1_0100_r0d2_1</p> <p>--- Group --- 1_0100_r0d2_f (1 item) LOD level 1 / LOD distance 0100 / keyword None Parent group: 1_0100_wheel03 Group objects: 1_0100_r0d2_f</p> <p>--- Group --- 1_0100_wheel04 (1 item) LOD level 1 / LOD distance 0100 / keyword None Parent group: 1_0100_bo02 Group objects: 1_0100_wheel04</p> <p>--- Group --- 2_1000_bo02 (1 item) LOD level 2 / LOD distance 1000 / keyword None Parent group: 1_0100_bo02 Group objects: 2_1000_bo02</p> <p>--- Group --- 1_0100_bo01 (1 item) LOD level 1 / LOD distance 0100 / keyword None Parent group: None Group objects: 1_0100_bo01</p> <p>Group children: 1_0100_wheel01 1_0100_wheel02 2_1000_bo01</p> <p>--- Group --- 1_0100_wheel01 (1 item) LOD level 1 / LOD distance 0100 / keyword None Parent group: 1_0100_bo01 Group objects: 1_0100_wheel01</p> <p>Group children: 1_0100_r0d1_1 1_0100_r0d1_f</p> <p>--- Group --- 1_0100_r0d1_1 (1 item) LOD level 1 / LOD distance 0100 / keyword None Parent group: 1_0100_wheel01 Group objects: 1_0100_r0d1_1</p>	<p>--- Group --- 1_0100_r0d1_f (1 item) LOD level 1 / LOD distance 0100 / keyword None Parent group: 1_0100_wheel01 Group objects: 1_0100_r0d1_f</p> <p>--- Group --- 1_0100_wheel02 (1 item) LOD level 1 / LOD distance 0100 / keyword None Parent group: 1_0100_bo01 Group objects: 1_0100_wheel02</p> <p>--- Group --- 2_1000_bo01 (1 item) LOD level 2 / LOD distance 1000 / keyword None Parent group: 1_0100_bo01 Group objects: 2_1000_bo01</p> <p>--- Group --- 1_1000_cab_interior (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_cab_interior</p> <p>--- Group --- 1_1000_rear_cp1r_pkt (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_rear_cp1r_pkt</p> <p>--- Group --- 1_1000_frnt_cp1r_pkt (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_frnt_cp1r_pkt</p> <p>--- Group --- 1_1000_lft_fuel_tnk (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_lft_fuel_tnk</p> <p>--- Group --- 1_1000_rt_fuel_tnk (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_rt_fuel_tnk</p> <p>--- Group --- 1_1000_pilot_frnt (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_pilot_frnt</p> <p>--- Group --- 1_1000_pilot_rear (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_pilot_rear</p> <p>--- Group --- 1_1000_cab (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_cab</p> <p>Group children: 1_1000_frnt_exh 1_1000_frnt_exh_cvr 1_1000_rear_exh 1_1000_rear_exh_cvr</p> <p>--- Group --- 1_1000_frnt_exh (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_cab Group objects: 1_1000_frnt_exh</p> <p>--- Group --- 1_1000_frnt_exh_cvr (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_cab Group objects: 1_1000_frnt_exh_cvr</p>	<p>--- Group --- 1_1000_rear_exh (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_cab Group objects: 1_1000_rear_exh</p> <p>--- Group --- 1_1000_rear_exh_cvr (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_cab Group objects: 1_1000_rear_exh_cvr</p> <p>--- Group --- 1_1000_rear_hood (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_rear_hood</p> <p>Group children: 1_1000_hdrail_rear_3 1_1000_hdrail_rear_4 1_1000_lft_fuel_f1lr 1_1000_lft_gearbx 1_1000_rear_hdrail_1 1_1000_rear_hdrail_2</p> <p>--- Group --- 1_1000_hdrail_rear_3 (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_rear_hood Group objects: 1_1000_hdrail_rear_3</p> <p>--- Group --- 1_1000_hdrail_rear_4 (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_rear_hood Group objects: 1_1000_hdrail_rear_4</p> <p>--- Group --- 1_1000_left_fuel_f1lr (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_rear_hood Group objects: 1_1000_left_fuel_f1lr</p> <p>--- Group --- 1_1000_lft_gearbx (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_rear_hood Group objects: 1_1000_lft_gearbx</p> <p>--- Group --- 1_1000_rear_hdrail_1 (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_rear_hood Group objects: 1_1000_rear_hdrail_1</p> <p>--- Group --- 1_1000_rear_hdrail_2 (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_rear_hood Group objects: 1_1000_rear_hdrail_2</p> <p>--- Group --- 1_1000_rear_door (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_rear_door</p> <p>--- Group --- 1_1000_rear_hd1gt_1 (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_rear_hd1gt_1</p> <p>Group children: 1_1000_rear_hd1gt_2 1_1000_rear_hd1gt_3</p>	<p>--- Group --- 1_1000_rear_hd1gt_2 (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_rear_hd1gt_1 Group objects: 1_1000_rear_hd1gt_2</p> <p>--- Group --- 1_1000_rear_hd1gt_3 (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_rear_hd1gt_1 Group objects: 1_1000_rear_hd1gt_3</p> <p>--- Group --- 1_1000_front_hood (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_front_hood</p> <p>Group children: 1_1000_frnt_hdrail_2 1_1000_frnt_hdrail_3 1_1000_frnt_hdrail_3 1_1000_frnt_hdrail_4 1_1000_frnt_hdrail_1 1_1000_rgt_grobx 1_1000_right_fuel_f1lr</p> <p>--- Group --- 1_1000_frnt_hdrail_2 (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_front_hood Group objects: 1_1000_frnt_hdrail_2</p> <p>--- Group --- 1_1000_frnt_hdrail_3 (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_front_hood Group objects: 1_1000_frnt_hdrail_3</p> <p>--- Group --- 1_1000_frnt_hdrail_1 (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_front_hood Group objects: 1_1000_frnt_hdrail_1</p> <p>--- Group --- 1_1000_frnt_hdrail_4 (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_front_hood Group objects: 1_1000_frnt_hdrail_4</p> <p>--- Group --- 1_1000_rgt_grobx (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_front_hood Group objects: 1_1000_rgt_grobx</p> <p>--- Group --- 1_1000_right_fuel_f1lr (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_front_hood Group objects: 1_1000_right_fuel_f1lr</p>
--	---	---	---

Choice 3: IGS export with:

```
[Miscellaneous]
MainObject=1_0100_frame
Hierarchy=unchanged
CustomKeyWords= frnt, rail, 1_0100_rod1_l, 1_0100_rod1_r, 1_0100_rod2_l, 1_0100_rod2_r, 1_0100_wheel01, 1_0100_wheel02, 1_0100_wheel03,
1_0100_wheel04
```

<pre> --- Groups list ----- --- 33 groups --- --- Group --- 1_1000_frame (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_frame --- Group --- 1_0100_bo02 (1 item) LOD level 1 / LOD distance 0100 / keyword _bo02 Parent group: None Group objects: 1_0100_bo02 Group children: 1_0100_wheel03 1_0100_wheel04 2_1000_bo02 </pre>	<pre> --- Group --- 1_0100_wheel01 (1 item) LOD level 1 / LOD distance 0100 / keyword 1_0100_wheel01 Parent group: 1_0100_bo01 Group objects: 1_0100_wheel01 Group children: 1_0100_rodl_1 1_0100_rodl_r --- Group --- 1_0100_rodl_1 (1 item) LOD level 1 / LOD distance 0100 / keyword 1_0100_rodl_1 Parent group: 1_0100_wheel01 Group objects: 1_0100_rodl_1 --- Group --- 1_0100_rodl_r (1 item) LOD level 1 / LOD distance 0100 / keyword 1_0100_rodl_r Parent group: 1_0100_wheel01 Group objects: </pre>	<pre> --- Group --- 1_1000_lft_fuel_tnk (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_lft_fuel_tnk --- Group --- 1_1000_rt_fuel_tnk (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_rt_fuel_tnk --- Group --- 1_1000_pilot_rear (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_pilot_rear </pre>	<pre> --- Group --- 1_1000_left_fuel_filtr (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_rear_hood Group objects: 1_1000_left_fuel_filtr --- Group --- 1_1000_lft_gearbx (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_rear_hood Group objects: 1_1000_lft_gearbx --- Group --- 1_1000_reardoor (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_reardoor </pre>
--	--	--	--

<pre> --- Group --- 1_0100_wheel103 (1 item) LOD level 1 / LOD distance 0100 / keyword 1_0100_wheel103 Parent group: 1_0100_bo02 Group objects: 1_0100_wheel103 Group children: 1_0100_rod2_1 1_0100_rod2_r --- Group --- 1_0100_rod2_1 (1 item) LOD level 1 / LOD distance 0100 / keyword 1_0100_rod2_1 Parent group: 1_0100_wheel103 Group objects: 1_0100_rod2_1 --- Group --- 1_0100_rod2_r (1 item) LOD level 1 / LOD distance 0100 / keyword 1_0100_rod2_r Parent group: 1_0100_wheel103 Group objects: 1_0100_rod2_r --- Group --- 1_0100_wheel104 (1 item) LOD level 1 / LOD distance 0100 / keyword 1_0100_wheel104 Parent group: 1_0100_bo02 Group objects: 1_0100_wheel104 --- Group --- 2_1000_bo02 (1 item) LOD level 2 / LOD distance 1000 / keyword _bo02 Parent group: 1_0100_bo02 Group objects: 2_1000_bo02 --- Group --- 1_0100_bo01 (1 item) LOD level 1 / LOD distance 0100 / keyword _bo01 Parent group: None Group objects: 1_0100_bo01 Group children: 1_0100_wheel101 1_0100_wheel102 2_1000_bo01 </pre>	<pre> 1_0100_rod1_r --- Group --- 1_0100_wheel102 (1 item) LOD level 1 / LOD distance 0100 / keyword 1_0100_wheel102 Parent group: 1_0100_bo01 Group objects: 1_0100_wheel102 --- Group --- 2_1000_bo01 (1 item) LOD level 2 / LOD distance 1000 / keyword _bo01 Parent group: 1_0100_bo01 Group objects: 2_1000_bo01 --- Group --- 1_1000_cab_interior (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_cab_interior --- Group --- 1_1000_rear_cpl_r_pkt (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_rear_cpl_r_pkt --- Group --- 1_1000_frnt_cpl_r_pkt (10 items) LOD level 1 / LOD distance 1000 / keyword frnt Parent group: None Group objects: 1_1000_frnt_cpl_r_pkt 1_1000_pilot_frnt 1_1000_frnt_exh 1_1000_frnt_exh_cvr 1_1000_frnt_hdrail_2 1_1000_frnt_hdrail_3 1_1000_frnt_hdrail_4 1_1000_frnt_hdlgt_1 1_1000_frnt_hdlgt_2 1_1000_frnt_hdlgt_3 </pre>	<pre> --- Group --- 1_1000_cab (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_cab Group children: 1_1000_rear_exh 1_1000_rear_exh_cvr --- Group --- 1_1000_rear_exh (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_cab Group objects: 1_1000_rear_exh --- Group --- 1_1000_rear_exh_cvr (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_cab Group objects: 1_1000_rear_exh_cvr --- Group --- 1_1000_rear_hood (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_rear_hood Group children: 1_1000_hdrail_rear_3 1_1000_left_fuel_filr 1_1000_right_fuel_filr --- Group --- 1_1000_hdrail_rear_3 (5 items) LOD level 1 / LOD distance 1000 / keyword rail Parent group: 1_1000_rear_hood Group objects: 1_1000_hdrail_rear_3 1_1000_hndrail_rear_4 1_1000_rear_hdrail_1 1_1000_rear_hdrail_2 1_1000_frt_hdrail_4 </pre>	<pre> --- Group --- 1_1000_rear_hdlgt_1 (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_rear_hdlgt_1 Group children: 1_1000_rear_hdlgt_2 1_1000_rear_hdlgt_3 --- Group --- 1_1000_rear_hdlgt_2 (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_rear_hdlgt_1 Group objects: 1_1000_rear_hdlgt_2 --- Group --- 1_1000_rear_hdlgt_3 (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_rear_hdlgt_1 Group objects: 1_1000_rear_hdlgt_3 --- Group --- 1_1000_front_hood (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_front_hood Group children: 1_1000_rgt_grbox 1_1000_right_fuel_filr --- Group --- 1_1000_rgt_grbox (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_front_hood Group objects: 1_1000_rgt_grbox --- Group --- 1_1000_right_fuel_filr (1 item) LOD level 1 / LOD distance 1000 / keyword None Parent group: 1_1000_front_hood Group objects: 1_1000_right_fuel_filr </pre>
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Choice 4: IGS export with:

[Miscellaneous]

MainObject=1_0100_frame

CustomKeywords=frnt, rail, 1_0100_rod1_l, 1_0100_rod1_r, 1_0100_rod2_l, 1_0100_rod2_r, 1_0100_wheel101, 1_0100_wheel102, 1_0100_wheel103, 1_0100_wheel104

<pre> ----- Groups list ----- --- 15 groups --- --- Group --- 1_1000_frame (19 items) LOD level 1 / LOD distance 1000 / keyword None Parent group: None Group objects: 1_1000_frame 1_1000_cab_interior 1_1000_rear_cpl_r_pkt 1_1000_lft_fuel_tnk 1_1000_rt_fuel_tnk 1_1000_pilot_rear 1_1000_cab 1_1000_rear_exh 1_1000_rear_exh_cvr 1_1000_rear_hood 1_1000_lft_fuel_filr 1_1000_lft_gearbx 1_1000_reardoor 1_1000_rear_hdlgt_1 1_1000_rear_hdlgt_2 1_1000_rear_hdlgt_3 1_1000_front_hood 1_1000_rgt_grbox 1_1000_right_fuel_filr --- Group --- 1_0100_bo02 (1 item) LOD level 1 / LOD distance 0100 / keyword _bo02 Parent group: None Group objects: 1_0100_bo02 Group children: 1_0100_wheel103 1_0100_wheel104 2_1000_bo02 </pre>	<pre> --- Group --- 1_0100_wheel103 (1 item) LOD level 1 / LOD distance 0100 / keyword 1_0100_wheel103 Parent group: 1_0100_bo02 Group objects: 1_0100_wheel103 Group children: 1_0100_rod2_1 1_0100_rod2_r --- Group --- 1_0100_rod2_1 (1 item) LOD level 1 / LOD distance 0100 / keyword 1_0100_rod2_1 Parent group: 1_0100_wheel103 Group objects: 1_0100_rod2_1 --- Group --- 1_0100_rod2_r (1 item) LOD level 1 / LOD distance 0100 / keyword 1_0100_rod2_r Parent group: 1_0100_wheel103 Group objects: 1_0100_rod2_r --- Group --- 1_0100_wheel104 (1 item) LOD level 1 / LOD distance 0100 / keyword 1_0100_wheel104 Parent group: 1_0100_bo02 Group objects: 1_0100_wheel104 --- Group --- 2_1000_bo02 (1 item) LOD level 2 / LOD distance 1000 / keyword _bo02 Parent group: 1_0100_bo02 Group objects: 2_1000_bo02 </pre>	<pre> --- Group --- 1_0100_bo01 (1 item) LOD level 1 / LOD distance 0100 / keyword _bo01 Parent group: None Group objects: 1_0100_bo01 Group children: 1_0100_wheel101 1_0100_wheel102 2_1000_bo01 --- Group --- 1_0100_wheel101 (1 item) LOD level 1 / LOD distance 0100 / keyword 1_0100_wheel101 Parent group: 1_0100_bo01 Group objects: 1_0100_wheel101 Group children: 1_0100_rod1_l 1_0100_rod1_r --- Group --- 1_0100_rod1_l (1 item) LOD level 1 / LOD distance 0100 / keyword 1_0100_rod1_l Parent group: 1_0100_wheel101 Group objects: 1_0100_rod1_l --- Group --- 1_0100_rod1_r (1 item) LOD level 1 / LOD distance 0100 / keyword 1_0100_rod1_r Parent group: 1_0100_wheel101 Group objects: 1_0100_rod1_r </pre>	<pre> --- Group --- 1_0100_wheel102 (1 item) LOD level 1 / LOD distance 0100 / keyword 1_0100_wheel102 Parent group: 1_0100_bo01 Group objects: 1_0100_wheel102 --- Group --- 2_1000_bo01 (1 item) LOD level 2 / LOD distance 1000 / keyword _bo01 Parent group: 1_0100_bo01 Group objects: 2_1000_bo01 --- Group --- 1_1000_frnt_cpl_r_pkt (10 items) LOD level 1 / LOD distance 1000 / keyword frnt Parent group: None Group objects: 1_1000_frnt_cpl_r_pkt 1_1000_pilot_frnt 1_1000_frnt_exh 1_1000_frnt_exh_cvr 1_1000_frnt_hdrail_2 1_1000_frnt_hdrail_3 1_1000_frnt_hdrail_4 1_1000_frnt_hdlgt_1 1_1000_frnt_hdlgt_2 1_1000_frnt_hdlgt_3 --- Group --- 1_1000_hdrail_rear_3 (5 items) LOD level 1 / LOD distance 1000 / keyword rail Parent group: None Group objects: 1_1000_hdrail_rear_3 1_1000_hndrail_rear_4 1_1000_rear_hdrail_1 1_1000_rear_hdrail_2 1_1000_frt_hdrail_4 </pre>
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14.4 TS2013 naming rule check

As indicated on railworkswiki:

All objects should follow strict naming conventions.

Each name starts with a single digit representing the LOD level, followed by a 4-digit visible distance between underscores. After this a logically chosen object name follows and the whole name is limited to a maximum of 31 characters.

The exporter checks the beginning of the name looking for a digit (LOD level), an underscore, 4 digits (visible distance), an underscore and the name.

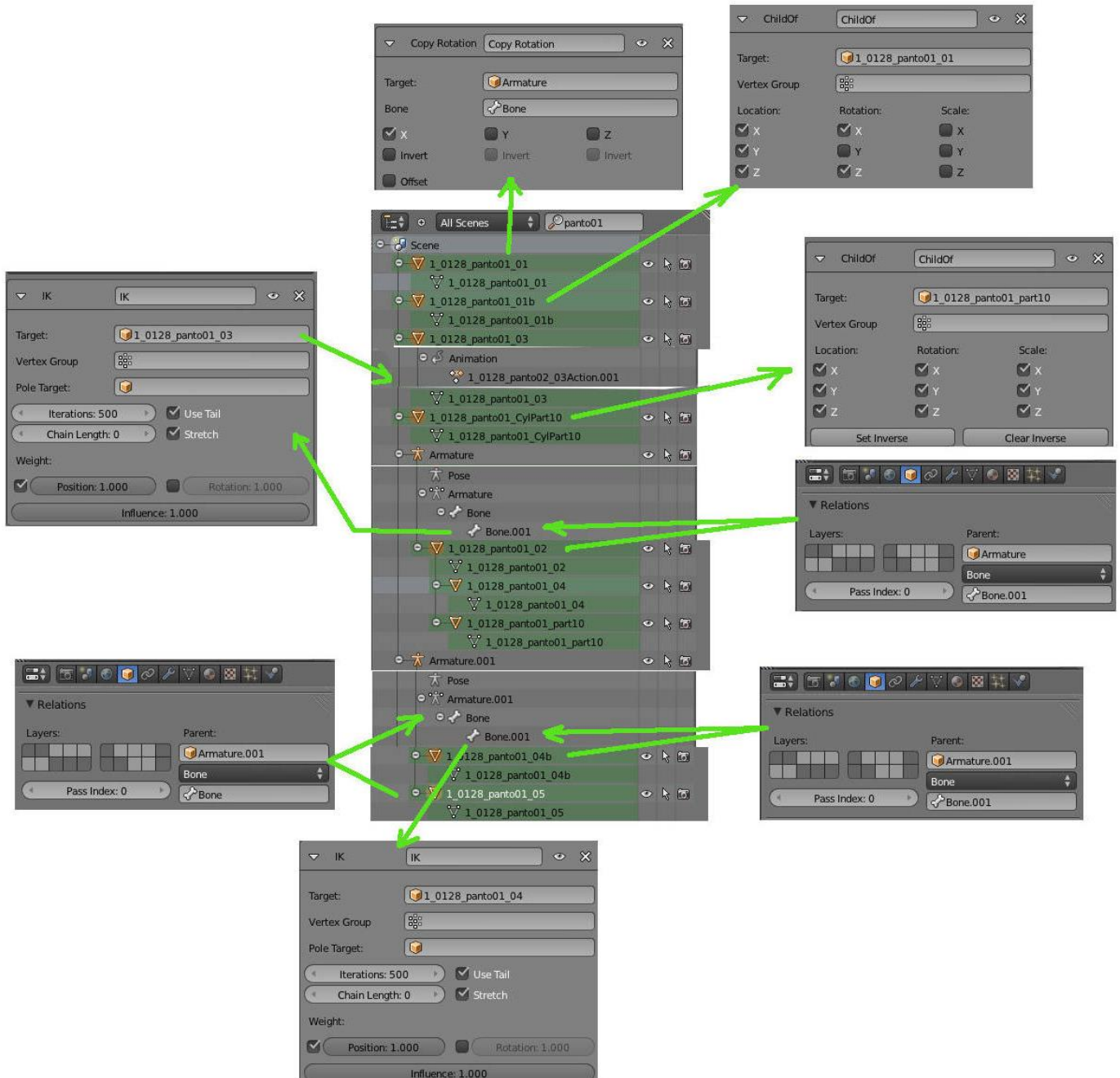
If the exporter doesn't find 1 digit, then an underscore, then a number, then an underscore, the name will be automatically converted to LOD = 1, distance = 1000, followed by the original name. For example, a Blender object named "MyObject" or "1-0100_MyObject" will be converted as, respectively, "1_1000_MyObject" or "1_1000_1-0100_MyObject".

Otherwise, a best fit to the number is found. For example:

- 1_02_object is converted as 1_0200_object
- 1_2_object is converted as 1_2000_object
- 2_10000_object is converted as 2_1000_object

Warning messages are written to the log file about misnamed objects which name is converted.

14.5 Selection example for IA export



These should be selected at least:

Object	Raison for selection
1_0128_panto01_03	Object without parent (no parentage created with Ctrl p). It has an animation.
1_0128_panto01_02	Object which parent is an armature
1_0128_panto01_CylPart10	Object without parent (no parentage created with Ctrl p)
1_0128_panto01_01	Object without parent (no parentage created with Ctrl p)
1_0128_panto01_01b	Object without parent (no parentage created with Ctrl p)
1_0128_panto01_04b	Object which parent is an armature

1_0128_panto01_05	Object which parent is an armature
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The other *panto01* objects like 1_0128_panto01_04 don't need to be selected because they are children of already selected objects.

Other objects not shown here (little additional parts) don't need to be selected either because they are children of *panto01*. They will be present in the exported animation.

14.6 Automatic numbering

Please refer to the excellent tutorial on:

http://www.chstrains.com/ts_faq_autonumbering.html (The paragraph about "*Multi/Sub-Object* material" is specific to 3DSMax.)

Please note that it may be necessary to import again the equipment in a scenario so that the game takes into account changes in xml files or in the Blender model.

In addition to this tutorial, here is how 3 numbering objects with 3 digits were implemented in Blender:

They are respectively named 1_0050_primarydigits_3 (for the number on the right of the image), 1_0050_primarydigits_3.001 (for the number on the opposite side) and 1_0050_primarydigits_3.002 (for the front number).

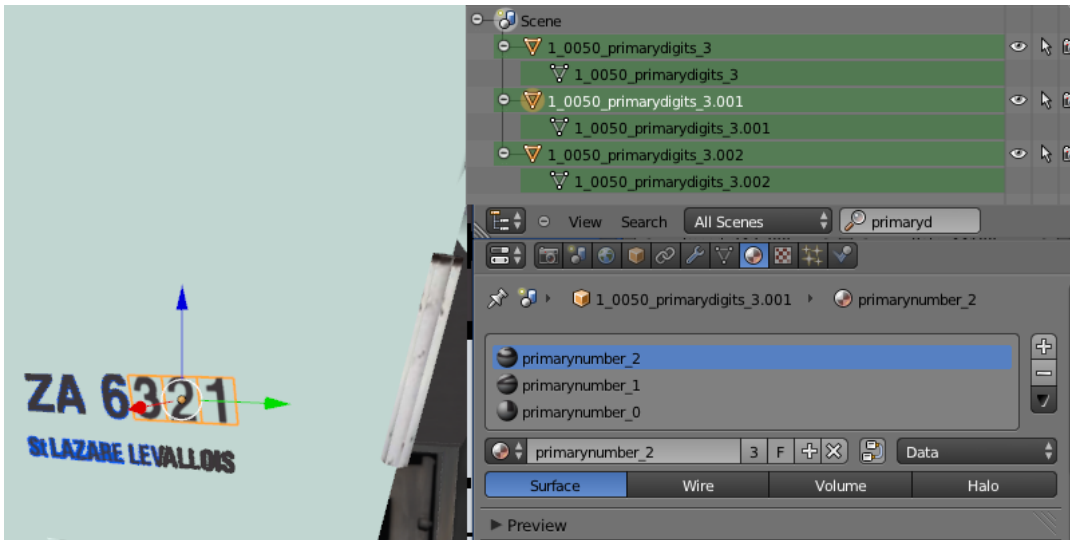


The white rectangle shows the main bicolour texture and the alpha alpha texture for digit 3 included in a 64 x 128 pixels tga file. The faces for the side grey number crop the grey area and the faces for the front white number crops the white area.

The number is set here to 467.

The 1_0050_primarydigits_3 object (1_yyyy_primarydigits_ followed by the number of digits = 3) is a plane divided into 3 faces. The other 1_0050_primarydigits_3.00x objects are created by duplication.

Each face is assigned a material: *primarynumber_0* (units), *primarynumber_1* (tens digit) ou *primarynumber_2* (hundreds digit).



In detail, each of these 3 materials is defined by (N is set to 0, 1 or 2):

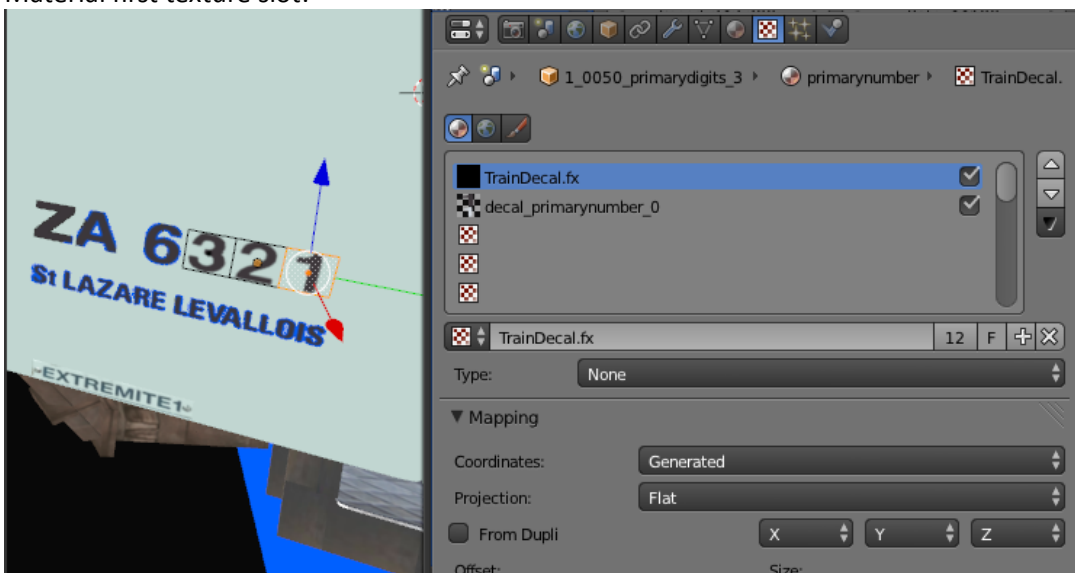
- Material name: *primarynumber_N*
- Image in UV-editor : *decal_primarynumber_N.tga*
- Material first texture slot: TrainDecal.fx
- Material second texture slot: texture named *decal_primarynumber_N* associated in the UV-editor to image *decal_primarynumber_N.tga* and associated to texture file *decal_primarynumber_N.tga*.

File *decal_primarynumber_0.tga* is created by copying and renaming *number_1.tga* (thus digit 1 is displayed in the above screenshot. This digit will be replaced in game by the corresponding value read in the csv file).

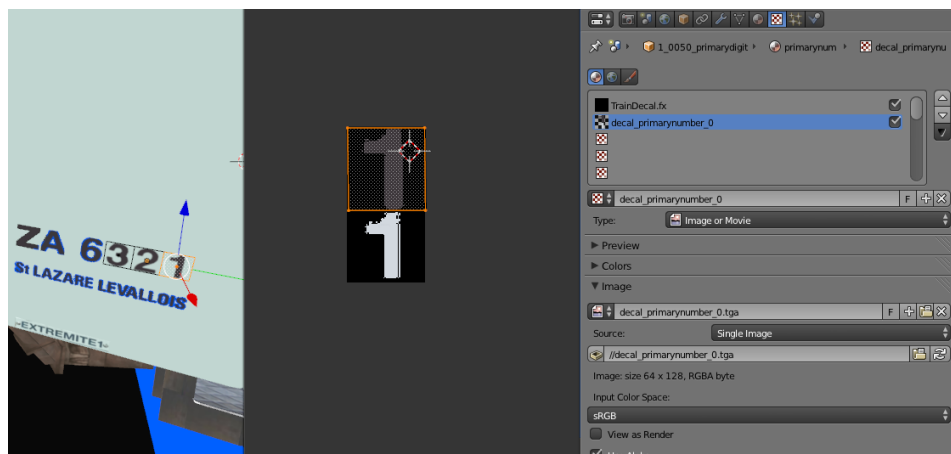
File *decal_primarynumber_1.tga* is created by copying and renaming *number_2.tga* (thus digit 2 is displayed in the above screenshot).

File *decal_primarynumber_2.tga* is created by copying and renaming *number_3.tga* (thus digit 3 is displayed in the above screenshot).

For example for *primarynumber_0*:
Material first texture slot:

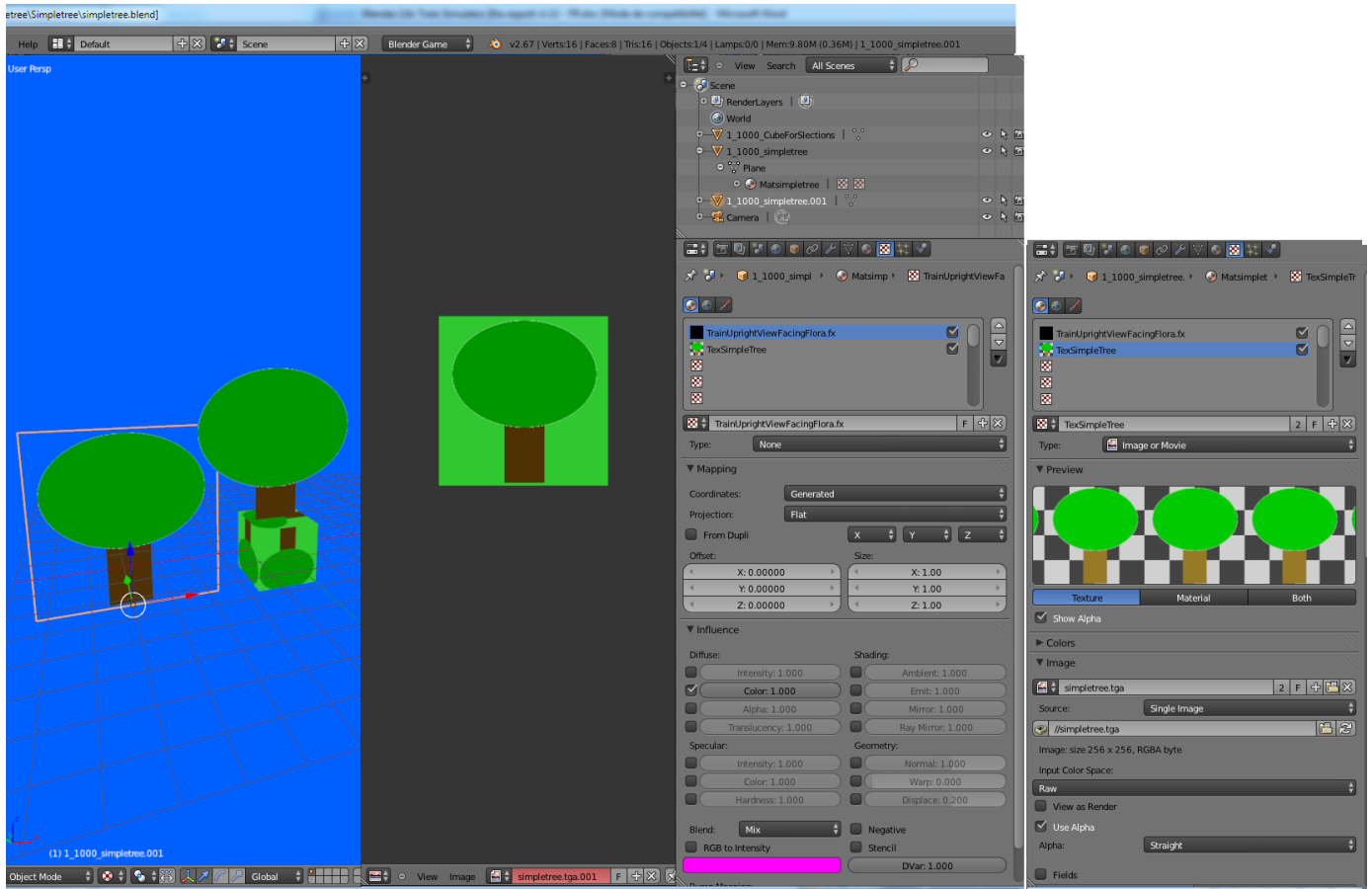


Material second texture slot (in the UV-editor, the image is *decal_primarynumber_0.tga*)



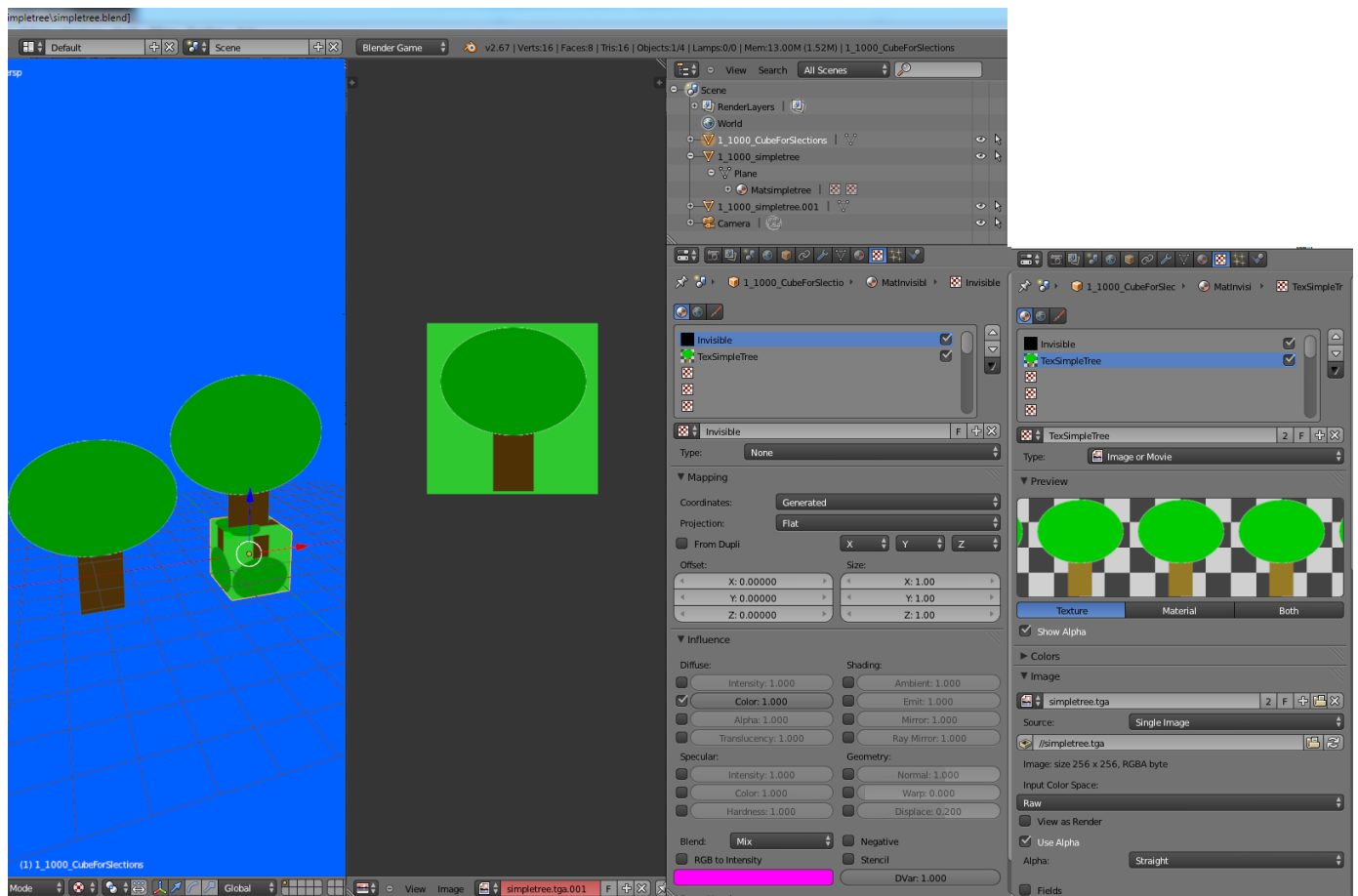
14.7 Example with TrainUprightViewFacingFlora.fx

Tree texture (Material "MatSimpletree"):



(Texture file provided by cilldroichid)

Texture for the selection cube (Material "MatInvisible"). An invisible object must be added otherwise it will be impossible to select the object once placed in a scenario. There is no special care to take to texture this item because it will not be visible.



File IGSEExpModFile2.txt:

```
[Materials:AlphaTestMode]
Matsimpletree=1

[Miscellaneous]
TargetTexturesDirectory=Textures
```

Result:



Blender 2.6x Train Simulator 20xx export – Documentation v1.13