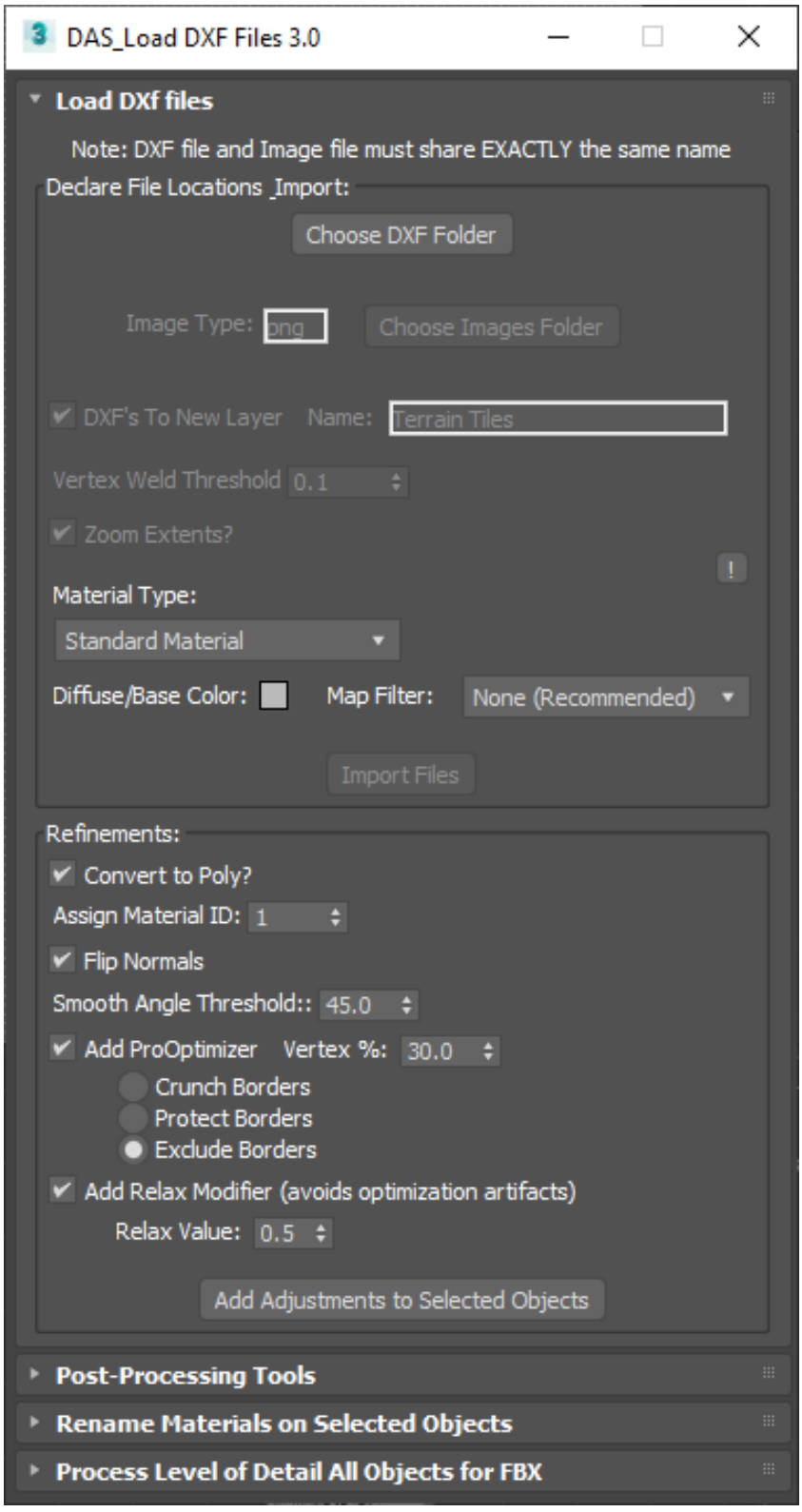
DAS_ GlobalMapper_DXF_Import_3.0

Help Document 01/21 by David Sparks
Updated 2/23



Introduction:

This MaxScript will allow you to easily import a group of DXF files exported from GlobalMapper as individual terrain "tiles". It will allow you to assign appropriate materials and configure the resulting meshes correctly. Most of this process is handled automatically with a minimal amount of effort on your part. Though the script itself is pretty straight forward, this document will walk you through each aspect of the script, item by item and include detailed comments that may be of help understanding the process. ***Note: None of the operations in this script are embedded within a maxscript "Undo" block! But there are adjustment options after the fact for any of the Modifiers you may add so don't despair.***

Critical Note: If you intend to Use VRay Materials, the script requires 3ds Max 2017 or later with VRay Installed. But be aware, export/translation of VRay materials to Unreal may not yield expected results.

Before you Begin:

Please make sure you understand how to correctly export content from GlobalMapper if this is also part of your task, though it's not necessary to use the script itself. Consult the documentation for Exporting Terrain Tiles to Unreal Engine ***"DAS_Terrain Procedure for UE4.pdf"*** for a general overview of the requirements and expectations for the content exported from Global Mapper. It's a good idea to read this document as well for some specific tips and instructions related to this entire procedure. Though there is a lot of additional information in this help document, it is intended as only that, a help file for running this script.

Once the GlobalMapper export has been completed you should have 2 separate folders for the script to access. One folder should contain the DXF files and one folder should contain the corresponding images to be applied to each DXF (as Materials in 3ds Max). Note that each folder may contain other content as well. The script will only be looking for the content it needs and will ignore anything else in these folders. However, if the appropriate content is not in either folder you will receive a notice from the script and you will not be able to proceed. "Appropriate content" for the DXF files is exactly that -- .dxf files. For the images folder, any image format supported by 3ds Max will work, but you will declare the file format to look for via the script. If files with that format are not found you will be notified and cannot proceed until files of the format you specified are found in the folder.

CRITICAL: As noted at the beginning of the script each .dxf file must have a corresponding image file **with exactly the same name.** For example: "Sea_A1.dxf" in the dxf folder and "Sea_A1.tif" in the separate images folder.

These 2 individual folders may be named whatever you want and can be located anywhere you want on the network. You will navigate to them from the script.

Step – Step

"Settings" group:

"Choose DXF Folder" -Button. Press this button to tell Max where the series of dxf files you wish to import is located. Note that individual files will not show up in the explorer window as you browse to the appropriate folder. Only folders will show. Once you have successfully point located the folder, and assuming this folder has .dxf files in it, the next folder browsing button (for the images folder) will become available. Once you have chosen the folder, the path will show up as text below the button. If the network path is long, it may not fit entirely across the script window's available space. In such a case, you will at least see the ending portion of the folder path and as much of the path as will fit across the script window's width.

“Image Type” -Text input field. Enter the image file format for the images exported from GlobalMapper (e.g. tif, jpg, tga, bmp, etc.). Do NOT enter the period “.” in this field, just the format name. It is not case-sensitive.

“Choose Images Folder” -Button. Press this button to tell Max where the folder containing your images is located. These images will be used as texture maps in your Materials. Note that individual files will not show up in the explorer window as you browse to the appropriate folder. Only folders will show. If there are no images of the format you specified in the folder, you will get a warning and will not be able to proceed until you correct the issue. Once you have chosen the folder, the path will show up as text below the button. If the network path is long, it may not fit entirely across the script window’s available space. In such a case, you will at least see the ending portion of the folder path and as much of the path as will fit across the script window’s width. The script will check the name of the 1st DXF file in the directory against the names of image files in the directory you choose, verify the naming convention matches and warn you if not. This assumes all your files in the directories follow the exact same naming convention.

“DXFs To New Layer” -Checkbox. Check this box if you want all the new imported dxf meshes to be placed on their own new layer.

“Name:” - Text input field. Enter the name you wish to use for the new layer.

“Vertex Weld Threshold” -Spinner. Enter the Weld Threshold you wish to use for vertices in the new mesh. Default = 0.1 system units. This is actually applied via mesh commands in Max, not via the DXF import translator.

“Zoom Extents" Checkbox. If checked, Max will zoom to the extents of all the imported meshes once processing is complete.

IMPORTANT NOTE ON TEXTURE MAPPING: Though not exposed to the user, the script will also automatically apply a “UVW Map” Modifier to each dxf mesh at the top of the stack. The mapping will be planer in the Z-axis as would typically be appropriate for this type of content. Real-World Texture Coordinates are handled automatically by the script, but due to limitations in MaxScript they are handled by literally opening the Preferences Dialog and evaluating the status of the Real-World Coordinates checkbox there. You will notice this happen very quickly when you execute the script, process the import or re-Apply mapping (see below). Have no fear though, however you have your Real-World Texture Coordinates set in your individual 3ds Max preferences, the script will not alter it.

“Material Type”:

Note: The Materials group settings can be changed after import. When made after import, any changes will be applied to the current selection.

“Physical Material/Standard Material/VRay Material” -Drop-down list. You may choose to have a Physical Material, VRay Material or a Standard Material applied to the object. The appropriate texture map from the images folder you declared will be applied to the diffuse property of the material. If the correct, matching texture map for a dxf cannot be found, a blank Bitmap texture will be assigned to the Diffuse property of the Material. When swapping between the Materials after import, Diffuse Color, Diffuse texture and bitmap filtering will be translated. Any Materials created by the script that may be showing in the Compact Editor will be replaced with the new material. No duplicates will be created. In the Slate Editor, ALL materials showing in the graph view tabs will be removed, again, to insure no duplicates will be created. Please be aware of this before proceeding.

NOTE: You Should NEVER open the script and try to use this switch as a “Material Converter” option in other scenes. It will only properly translate the parameters shown and will likely yield unwanted results in any other scene.

“Diffuse/Base Color” -Colorpicker Swatch. The color to use for this property in the material. Default is neutral grey 128,128,128.

“Map Filter” -Drop-down list. This option is made available in an effort to avoid artifacts at render time caused by Max’s own image anti-aliasing algorithms. Max’s default for bitmaps is “Pyramidal” but I have seen this cause artifacts at the edges of the dxf terrain tiles where the textures must meet seamlessly. You typically want your modern render engine to handle this aspect of image processing in which case “None” is the recommended choice. It’s up to you. Resolution of the image can also play a role in your decision to tweak this property. Note, as mentioned, this property can be changed after import so you are not stuck with your initial choice.

“Import Files” - button. This will process the entire operation. Depending on how many dxf’s you have to import, this may be a good time to go have lunch. If you cancel the operation mid-stream, the script will throw an error and you will need to open the script fresh and start over. Note: A single DXF with approximately 300K faces can take about 1 minute to process depending on settings and hardware configurations. It should be obvious when the script has finished the import process though there is currently no overall progress bar other than the typical, individual dxf file import progress at the bottom of the interface.

“Refinements”

Note: These modifications are intended to be added after import to a SELECTION of objects. You might experiment on a single tile to get your refinements dialed in. With the exception of the “Convert to Poly” checkbox, these Modifiers can all be adjusted after-the-fact in the “Post-Processing Tools” rollout so have no fear. But be careful with the poly conversion option. There’s no going back from that!

“Convert to Poly” -Checkbox. Checking this box will immediately convert the newly imported dxf to an Editable Poly. Upon import, as with any other dxf import, the mesh is initially an Editable Mesh object in Max.

“Assign Material ID” -Spinner. The script automatically applies a “Material” Modifier to the object. This setting allows you to specify a Material ID for the entire object. NOTE: This setting can be changed after import. See Post-Processing Tools” below.

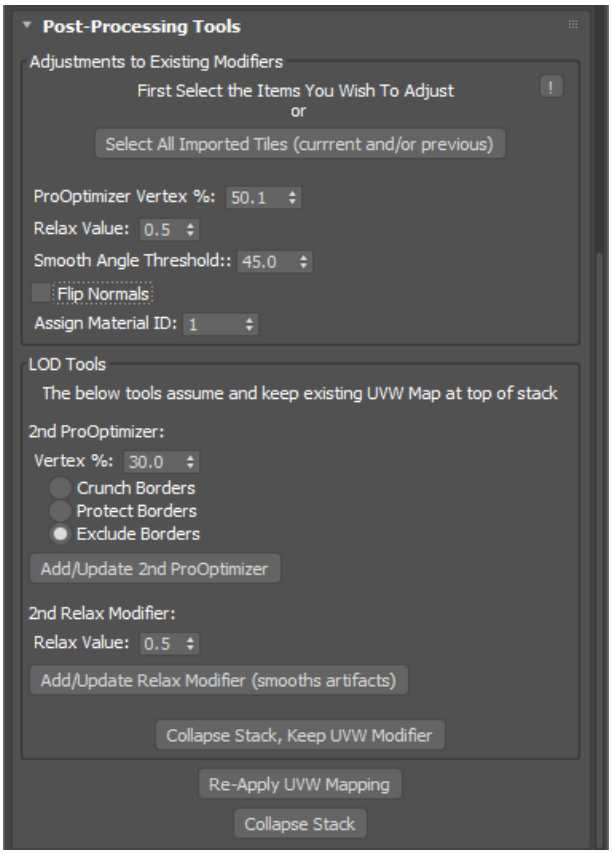
“Flip Normals” -Checkbox. The script automatically applies a “Normal” Modifier to the object. Should the normals need to be flipped, check this box, otherwise, leave it unchecked. In most cases, dxf’s exported from GlobalMapper will need to have their normals flipped in Max. NOTE: This setting can be changed after import. See Post-Processing Tools” below.

“Smooth Angle Threshold” -Spinner. The script automatically applies a “Smooth” Modifier to the object. Enter the desired angle threshold. Note that applying “Smooth” also resets all Smoothing Groups to 1. NOTE: This setting can be changed after import. See Post-Processing Tools” below.

“Add ProOptimizer Modifier” -Checkbox. Checking this box (Checked by default) will add a “ProOptimizer” modifier to the object. This Modifier will be placed at the bottom of the stack, just above the base object. Hence, all other possible adjustments to the object(s) (e.g. Smoothing, Material, Normals, Mapping, etc.) are applied AFTER ProOptimizer. This ensures that you do not have to Re-Calculate the ProOptimizer mesh when making any other changes to the object.

“Vertex %” -Spinner. This is the Vertex Percentage used by the ProOptimizer Modifier when applied. Lower values take longer to process, but this will also be true if you make the changes after the fact. As hinted, this setting can be changed after import. See Post-Processing Tools” below.

“Post-Processing Tools” Rollout:



“Adjustments to Existing Modifiers”

NOTE: All the commands in this section affect the current selection only. If nothing is selected, these commands have no effect. This section is intended to be used to correct or alter settings that were originally added in the “Refinements” section above. Adjustments to “Refinements” that were not added will have no effect. You will get a warning that the corresponding modifier does not exist on the object(s).

“Select All Imported Tiles (current and/or previous)” -Button. This is provided as a courtesy. Pressing this button will select ALL dxf meshes that have been imported using this script, whether in a previous session or the current one. The script embeds a custom identifier in each object upon import and this allows us to quickly select just these particular objects for editing or any other purpose. Again, meshes imported by the script in a previous session will also be selected.

The next group of commands correspond precisely to their original counterparts in the “Refinements:” section. Assuming you have not collapsed any of the imported meshes, you should be able to adjust these common parameters to your liking even if you have saved, closed Max and re-opened the file. Note that you can use these adjustments independently on a subset of objects or even individual objects if you so desire.

“LOD Tools”

NOTE: This section begins a set of tools specifically designed to assist with creating multiple LOD’s, useful if you plan to use the terrain tiles in Unreal Engine. Please see the documentation on preparing your tiles for Unreal: “DAS_Terrain Procedure for UE4.pdf”.

Once you have your highest level of detail created from the script after import using the above options you should save a copy of your scene as this will be the base reference for all future modifications. If you accidentally apply or collapse something that can't be edited again you wouldn't want to have to repeat the entire import process!

NOTE: Before adding a Modifier with the options below, it is assumed that you will have collapsed your primary, highest resolution tiles. I recommend using the "Collapse" options at the bottom of this section, particularly the one that preserves the original UVW Map Modifier at the top of the stack.

"2nd ProOptimizer": Basic settings….

"Add/Update 2nd ProOptimizer" -Button. Adds a new Modifier with the settings you choose IF ONE DOES NOT EXIST ALREADY. If you have applied a 2nd ProOptimizer modifier with this button, simply press it again to update any settings you might have adjusted.

"2nd Relax Modifier": Basic settings….
Functions just like the ProOptimizer options above, adds or updates a Modifier applied through this option.

"Collapse Stack, Keep UVW Modifier" -button. As it implies, it will collapse the stack, leaving only a top level UVW Map Modifier which you should always have for these tiles.

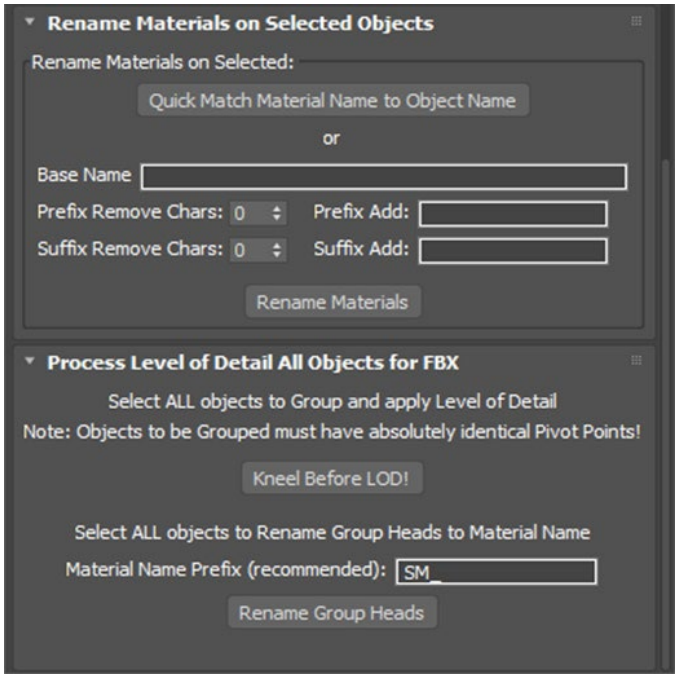
"Re-Apply UVW Mapping" -Button. Pressing this button will remove any UVW mapping ***applied using this script*** and re-apply the mapping. Mapping will fit to the bounding extents of the object (as it does initially). It does NOT deal with any UVW mapping uniquely applied by the user. Be aware that the mapping applied by the script will always be at the top of the stack.

"Collapse Stack" -button. As implied, this will collapse any selected objects to Editable Poly objects, permanently removing any ability to tweak them further with this script. If you're worried about pressing this button, it might be a good idea to "Hold" or "Save" your max scene before proceeding.

"Rename Materials on Selected Objects"

"Quick Match Material Name to Object name" -Button. Pressing this button will take all materials on selected objects and rename the material to match the name of the object it is assigned to. Not necessarily a useful thing in general terms but useful for this script early on to get proper material names, usually before you have begun specific, unique names to your objects based on their LOD and before final naming conventions (see special note below). The original imported Materials created by dxf import usually have extraneous characters in the names. This is a quick way to get things to match.

"Base Name" -Text input field. This field and the options below it allow for custom naming of materials based on a selection of objects. Primarily for editing the names of existing materials (again, see special note below).



"Process Level of Detail All Objects for FBX"

"Kneel Before LOD!" -Button. Pressing this button will Group all selected objects that share the EXACT same Pivot Point and execute the "Level of Detail" utility on the group making it ready for export to Unreal.

"Rename Group Heads -Button. The above process will create group heads but they are named with default "Groupxxx" names. Unreal will be looking at the group head (parent) to name the Static Mesh components upon import. Assuming you have used good Material Naming conventions to associate meshes and materials, this button will take the name of the material assigned to the group members and rename the group head to this name. However, you should also prefix the name to differentiate it from the Material Name. Standard practice in Unreal for static meshes is an "SM" prefix. ***Critical Note on Naming Conventions for Unreal Import: Upon FBX import, Unreal uses the base name of all entities (textures, meshes, materials) without regard to extensions or entity types. None of your entities can share the exact same name or you will have conflicts upon import. Therefore, your Materials should have a prefix or suffix such as "M" for Materials, and meshes prefixed/suffixed with "SM" (Static Mesh) and textures with "T". The script and Max's "Rename Objects" tool are your best friends here, but it is up to you to name your textures appropriately. After all, the textures had to be named exactly the same as the terrain dxf's originally. If you have a lot of textures, there are some Windows utilities for renaming files in explorer. Generally a good idea to have one of those installed anyway.***

Export to FBX for Unreal:

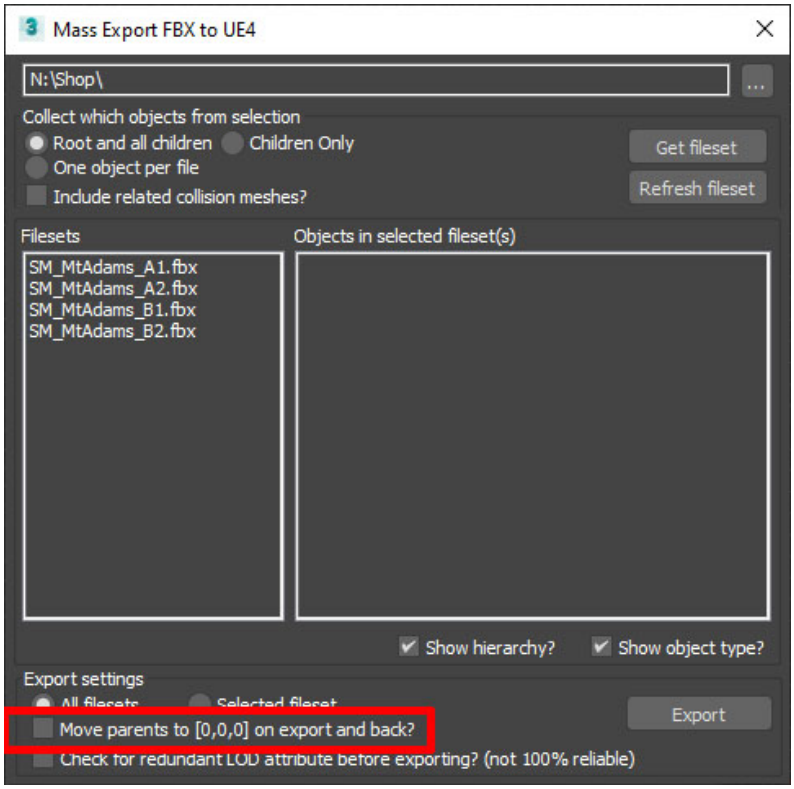
The best resource for easy export of multiple FBX files for unreal, especially if you have multiple LOD groups prepared with Max's Level of Detail utility, is this excellent macro script by Anders K. Nielsen:
"Mass Export FBX to UE4.mcr" http://www.mcgreed.dk/maxscripts.html

General instructions:
1. Set a file path where the FBX exported content will go.
2. Select all the entities you want to export then press "Get fileset" on the script.
3. Make sure and uncheck the option to move parents to world zero.

When you press "export" the standard FBX export dialog will appear for you to choose your settings and options. This will only happen once upon initial export. Of course you need to choose the "Animation" option for objects with LOD's.

Anders has several other maxscripts at his site worth exploring. Thanks!!

Note: I have included a regular ".ms" version of Anders macroscript at the DAS website so you don't need to set it up as a macro in order to execute it.



Anders K. Nielsen's "Mass Export FBX to UE4" macroscript

David Sparks, revised for script version 3.0, Feb. 2023