

FIFTH DIMENSION ARCHITECTURE+INTERIORS



Twinmotion

TWINMOTION MANUAL

By: Sarah Clifton Yandell

ATLANTA | AUSTIN | BIRMINGHAM | ORLANDO

www.5DA-i.com

TWINMOTION 2020.2

PREPARATIONS

- o The latest version of Twinmotion and the Direct Link Plugin for Revit need to be installed.
- o You should also download the Unreal Datasmith Plugin for Revit.
- o The Timeframe Allotted to Perform the Work vs Timeframe Needed to Perform the Work
 - The due date of the animation should be the first thing to ask your supervisor / client.
 - This is very important in order to stay within budget on hours spent and so that we can make sure we do not miss the deadline.
- o Level of Detail Needed / Desired
 - Will the animation be schematic in nature or will it be more photo-realistic? This will determine the level of detail needed for modeling and for how much entourage needs to be added.
- o Assigning Tasks / Duties
 - For team projects make sure you discuss who is working on what so that work / information is not deleted or duplicated.
- o Expectations
 - We never want to send out bad work or work that is misleading, inappropriate, or otherwise would have a negative impact on our firm. It is recommended that you check in often with your supervisor and/or manager to make sure you are proceeding in a direction that can meet the deadline, be used for marketing our firm's capabilities, and meet the projects intent and goal.

MODELING (REVIT)

- o Follow the correct **Revit Model Setup Procedure** outlined below.
- o To ensure there are no unintended changes to the working model, make a detached copy of the most recent Revit model and place in the following location:

"Job/Revit/Current Model/ Job# Project Name - Twinmotion Models" (ex. "18108 2100 Morris - Twinmotion Models")

If this folder has not already been created, create it.
- o If there are multiple buildings to be placed in the model, create a Revit Site Plan model and link the detached building models into the new Site Plan model.
- o Once the all needed models are in place correctly on the site model. Create export views for each building and hide elements not associate with each respective building or types of buildings.
- o It is important that materials are assigned in Revit prior to bringing into Twinmotion. Anything modeled that has the default material applied to the object or surface is BAD and will need to have the correct material assigned to the object or surface. Also keep in mind ground materials and places where you will need to place grass. Anywhere with the same material will also get grass or flowers. If you need to create a new material in Revit make sure you are using a simple, organized, easy to follow naming system for that material. This helps if you are working in a team and for situations where you may be pulled off the project due to sickness, vacation, higher priority on another project, etc.
- o Look for any holes, gaps, or conflicts in the model that need to be addressed. Also try to keep ZFighting down.

ZFighting is when two objects overlap. If the objects have different Materials applied it can especially stick out. Remember to coordinate with your project manager if you have a question or unsure how to fix a certain situation.

- o Use your 3D Export views for exporting to Twinmotion. Within the Twinmotion tab, click export. In the popup, ensure that you export "Visible" that "Textures are integrated into the saved file" that you merge "By family" and that the mesh is an "Optimized model" is selected. Once your file is done exporting it will be saved as a .fbx.

"Job/Design/Twinmotion/Revit Exports" (ex. "18108 2100 Morris Site")

- o I would also like to point out that while in Revit if you want to you can easily preview your model in Twinmotion. All you have to do is make sure you are on the Twinmotion tab, then you click "Preview in Twinmotion". A Twinmotion file with your project will proceed to open. This file is ONLY for previewing. It cannot be saved. It helps you troubleshoot your model before the final export.

IMPORTING MODELS TWINMOTION

- o The import process can be a little bit complicated there are a lot of settings that can change the whole workflow of the visualization. The most important one is how to collapse the hierarchy. This determines how Twinmotion merge the model. Each one is different and which one you use depends on how well the model is setup.

- **Keep Hierarchy:** Keeps the hierarchy of the families setup in Revit. This makes it so you can separate objects easier you materials aren't as organized.
- **Collapse by Material:** This collapses the model by the materials you put together in your scene. This can make it so your hierarchy isn't as large and there aren't as many separate components to the scene.
- **Collapse All:** Collapses the model all into one object while the materials stay the same as they were when you set them up.

- o The second box that needs to be checked is the Fix UV/Textures box. You need to make sure this box is checked. Revit does not have any algorithm for auto UV's so you must make sure this box is checked. If your textures don't look high rez enough or the scale is way too small then you forgot to check this box.

- o The rest of the settings can stay the same as they are automatically.

- o Here is a list of the different file formats that Twinmotion accepts in case you can't export the model from Revit that day.

- Main File Types (.fbx, .skp, .obj, .c4d, .udatasmith)
- Other Accepted File Types (.3ds, .dae, .dxf, .iv, etc.)

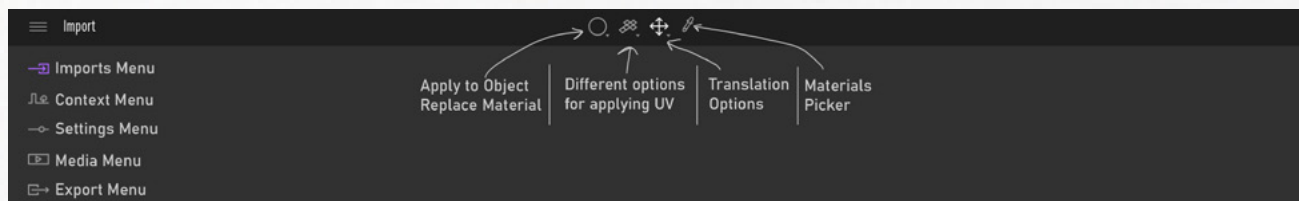
THE BOTTOM MENU IN TWINMOTION

- o This menu takes up the bottom portion of the screen

- o The second button changes how the textures are displayed on an object. If you have something that is spherical, cylindrical, or cubic you can change the UV's of that object based off of which setting is selected.

- o The third button is the different translation options. There is Move, Rotate, and Scale.

- o The 4th button is the material picker. You click on a material while it's active to show that material's properties and change them.



MATERIALS MENU IN TWINMOTION

- o The materials menu in Twinmotion is very easy to navigate and change. There are some specific ways you need to prepare texture maps if your going to put in a custom texture but they have a pretty large library of materials already in the program.
- o Here is a video about how material work in Twinmotion and how the normals work. It might be a bit different to the workflow you are used to <https://www.youtube.com/watch?v=1FF7XWbj39w>

CONTEXT MENU IN TWINMOTION

- o The Context menu in Twinmotion contains Paths, Vegetation paint, Vegetation scatter, and the Urban tab. All of these tabs effect the scene of your visualization.
- o The Paths tab is how you add objects that constantly move. The main three are Character paths, Vehicle paths, and Bicycle paths. The Last option is for a custom path.
 - A **custom path** can make it so any static mesh in the library can follow a path. Once the path is made you can do things like change the speed of the object, change how it is being animated, reverse it, delay the start if looped, rotate the object, and turn follow and physics for that object on and off.
 - The vehicle path has the most parameters out of all of them but when making a scene try to make the parameters as close to realistic as possible.
- o The Vegetation paint tab makes it so that you can paint any type of vegetation onto any object or landscape. This can be very useful but you need to be very careful that you dont paint in unnessisary places. The engine saves performance by instanceing 1 of whatever you are painting with but it can still use up performance if you paint on an unnessisary place.
 - It is best to use vegetation paint with trees and bushes instead of grass.
- o The next tab is the vegetation scatter. This is like a paintbucket tool for plants. Usually it should mostly be used for grass but it can be used for anything.
 - when putting in grass you have to instance it 2 or three times. Everytime you drag an item from the library into the bottom panel you click on what you want to instance then click the material you want to instance the vegetation on.
- o The last tab in the urban tab. This tab makes it so you can put an address in and it will atuomatically pull up the landscape for a project and put it in the world.

SETTINGS MENU IN TWINMOTION

- o This menu is the menu that changes the way you see the world. It add filters changes the lighting settings and changes the location of the sun based off the address of the building.
- o The first tab under the settings is the **location tab**. This changes the location of the sun, the time of day, and the month. You can also offset the north position of the sun to change the way lighting looks in interior spaces.
 - Another option in the location tab is the background setting. You can change the background to one of the background the programs provides and turn it to any angle.
- o The second tab is the **weather tab**. The weather tab can add more clouds in the sky to making it pour rain. It can also change the season so that its fall or so that it can even snow. The coolest part of all this is that the vegetation changes with the weather so when it is turned to fall the trees turn orange or in the winter all the leaves fall off.
 - **Effects:** In the effects tab you can effect the speed and direction of the wind. The wind blows through most of the vegetation to make the environment seem more alive. The Smog setting can effect the lighting because it can create light shafts. **Smog** can give the environment a different atmosphere and can be messed with. There is a setting in most of the lights that can be placed in the environment that makes it so they attract fog and make lighting more dynamic.
- o The third tab is the **lighting tab**. This tab changes the lighting in the world. All of the settings are very important when rendering a scene. Some of the settings are pretty self explanatory but I will explain some of the more complicated ones.
 - **G.I. (Global Illumination):** Increasing the GI Distance increases the reflection distance of the global light source, or the Sun/Moon (depending on your time of day). A higher GI can increase rendering times but it also increases light bounces and make a scene more realistic.

- **Shadow and Shadow Bias:** These settings control how streak and how sharp shadows are. I Play around with this value once my scene is complete or if I am trying to get a test render it i will mess with it.

- Inside the lighting settings tab there is Sun Reflection, Star Intensity, and Ambient Lighting. The sun reflection is how much the sun reflects off of materials outside. I use this value when im taking renders where you can see the road/concrete a lot. It changes how reflective the concrete is easily and can change the mood of a scene. The ambient lighting obviously changes the ambient lighting and this makes the biggest change I would say in interior spaces.

- o The fourth tab is the **camera tab**. This tab can change your main viewport and change your individual renders. There are 5 main panels and a visual effects panel. The buttons im not going to talk much about are the vignetting slider and the lens flare slider. These two should be active only during picture renders.

- o First is the FOV (Field of View), this makes it so that you can change the focus of the camera.

- o Then we there is DOF (Depth of Field), This changes the focus and other camera settings. Inside of DOF there is Aperture and Bokeh Shape.

- **Aperture** is what says how blurry the background of an image should be.

- **Bokeh Shape** changes the shapes of the light blurs in the render.

- o Turning on Parallelism changes the lines and angles to make them just a bit straiter and get the right angle that your looking for. This should be turned off unless you are using it for picture renders.

- o The **Camera > Visual Effects** tab has many cool different features and filters so that you can achieve a photoshop quality render strait out of Twinmotion. The tabs under here are as follows.

- Color Gradient

- > This is a very simple menu of buttons. This lets you choose a filter for your viewport or render shot and then use contrast and saturation on to further change them.

- Filters

- > These filters don't change only the viewport but also how the geometry is perceived. Is is more than a post processing. You can make the model look like a blueprint or make it so its outlined like an anime.

- Clay Render

- > This option makes it so that you can turn your entire model into clay. There are various sliders and settings available to that you can change the way the clay looks. I am not sure why this is needed for archvis but if you want to show a model with no textures for a client this option may be viable.

- Reflections

- > This setting turns off all reflections from the scene.

MEDIA MENU IN TWINMOTION

- o This menu is where you organize all of your renders. The different types of renders are Images, Panoramas, Videos, and Presenters. On a sidenote Phasing was just added to Twinmotion but I am not sure how it works yet.

- One important thing to note is that when you take a render you can filter each render individually and change all of the previous settings I've described so far in each render before saving it. You can access this by pressing the **more** button.

EXPORTS MENU IN TWINMOTION

- o This menu is where you export your renders. Its pretty strait forward. All you do is click on what you want to render. Select the pictures you want, you can select multiple of different types. Once everything is selected you click the more button and change the settings to make the render look more realistic.

(ASSET LIBRARY) IN TWINMOTION

- o There are 7 main types of assets in the Asset Library. They are Materials, Vegetation and Landscape, Objects, Lights, Characters, Vehicles, and Tools. Each contains assets that can be used many different types of ways. I am not going to talk about the materias because I already did so.

- o The first type of asset that im going to talk about are the **Decals** which are located in the Objects folder. There are many different types of decal assets assets, from parking lines, to shadows, grafitti, and leaves there are many uses for them and they can be placed on any surface.

o The second type of assets are **particle generators**. There are water, fire, and smoke particle generators available for use in Twinmotion. There are no parameters available for the particles but they still work just fine.

o I would also like to say there are different ways you can use water. There are water meshes available in the objects folder and you can also apply a water material available in the materials folder on any mesh. This makes it so that the water is very versatile.

o The 7th asset folder is the sound asset folder. This is a collection of sounds that can be placed throughout the world and as the player gets closer to where its placed the sound gets louder. This makes the customer more immersed into the environment.

o The last asset in the objects folder that is the most exciting to me is the new door assets provided. There are animated rotated and sliding doors. This is a great addition to Twinmotion because if there is a space you want to enter in vr you usually cant just go through the door so making it so you can add a door that is animated is great and feels very interactive for the person in the environment.

o If you look in the characters folder you'll see many different kinds of people who are able to do different kinds of things and interact in a scene. There are animated humans, groups of animated humans, posed humans, and cutout people. Cutout people are actually billboard particle meaning its just an image of a person that follows the camera. This makes it so you could put many many of these in a scene.

- In the characters folder there is also a folder for animals. Most of these animals dont walk around but they have stationary animations. The ones that do move are the fish, birds, and butterflies.

o In the lights folder contains many lights with **EIS Lighting profiles** and 4 other kinds of lights with different parameters.

- The four other lights without EIS Lighting profiles are the onmidirectional light, spotlight, neonlight, and area light

o In the Vehicles folder there are many different types of vehicles. The vehicles are cars, buses, boats, aircraft, two-wheeled, construction machines, and trucks. Most of these objects are not animated but some of them are. You dont really need animations for them though.

o **Landscaping** in Twinmotion is pretty strait foward with lots of options on how you can customize your landscape.

- First you have to go to (Vegetation & Landscape > Landscapes) and choose from either flat or rocky landscapevs. Before placing this in the world however you need to get rid of the starting ground object in the heirarchy. This way you don't have 2 different grounds.

- Once the landscape is placed in the world you can edit it by simply clicking on it. Once you do so two options will be available; Sculpt Terrain and Paint Terrain.

- The "sculpting" option is for sculpting the Terrain and theres a variety of tools available to do so. The most obvious tools are raising, digging, smoothing, and flattening the land. The other tools have a more specific use, they are the noise and erose tools. The **noise tool** is used to make more variations in the landscape height. The **erosion tool** is used to make a landscape that looks like water eroded it. Noise tool adds to the landscape and erosion subtracts basically.

- The "painting" option is for painting different textures onto the terrain. It also has auto terrain built into it. Meaning when you raise and dig the terrain it automatically changes the texture with the height and slant of the terrain. This can be very quick and useful. Also there is the option to paint the textures strait onto the landscape. You can change the brush size, texture scale, opacity, and shape of the brush giving you lots of customization.

o In addition to landscaping by hand you can also import many different formats of terrain strait into twinmotion from elsewhere. You can import a physical terrain or site that has already been sculpted by going to the import tab and instead of importing an object select landscape. In addition to being able to import meshes you can also import height maps. To get an accurate height map go to <https://terrain.party/> and find the site you are building on. Then Before exporting from terrain party make it full screen to get a higher resolution save. Save and then open photoshop. Once in photoshop open a document sized 4096x4096. This is the square 4k size for a usual 4k texture. Then drag the saved picture that has (Merged) at the end into the document and resize to fit. Once this is finished save as a .PNG and import the file into Twinmotion.

- The setting that controls how high to make the landscape is the Amplitude. If you dont want much height in a scene set it to a value between (5-30). If you want more height set it much higher.

- Make sure that the smoothing check box is checked so that the landscape doesn't import with sharp edges. If you run into this problem that is the fix.

- o **Tools Folder** in the Asset Library: This folder contains the sections, reflection captures, notes, measuring tool, and the newest tool animators. Each tool has very specific actions which is probably why they are in the tools folder itself.

- The **section tool** makes it so you can section off the building and see inside from the outside. So if you want to see the room layouts from the outside of a building you would section off that side of the building and it would cut the wall open and show whats on the other side.

- The second tool is the **Reflection probe tool**. The reflection probe tool is actually a pretty complicated tool. But it creates reflections on metallic and glass surfaces. For more in depth information on them check out this link.

https://twinmotionhelp.epicgames.com/s/article/Improve-reflections-in-Twinmotion-with-Reflection-Probe?language=en_US

- The third tool is the **Note Tool**. With this tool you can place notes anywhere in the world and customize them in size and color. You can place notes in places so that if you have a known issue with the model and someone else opens it they know about that issue. Or if the customer wants a specific area changes you can add a note to that area.



- The **Measuring tool** this tool can be used to measure varios spaces in feel or meters. It automatically knows once its hit a wall so all you do is drag it into the scene and then once it hits another wall perpendicualr to where you placed it. You will then be told how far away that wall is.



- **The Animators** are a very interesting addition to Twinmotion. These will animate any object in Twinmotion. You can link or unlink multiple objects to them. These are reletivly new so play around with them and see what cool things you can do with them. Currently I am using one to animate water plane so that the waterline on the beach rises and falls.

RIGHT SIDE MENU (HEIRARCHY LAYOUT)

- o The heirarchy is used a lot though out your workflow in Twinmotion.
- o Whenever you add any kind of asset to the scene except materials and textures this object will appear in the heirarchy layout. Try to keep these objects organized by areas or types of objects from the get go so things dont get lost.
- o Importantly the only way I've found to delete an asset from the scene is by deleteing it from the heirarchy menu.
- o You can parent/child object inside the heirarchy. This can be useful because If you have an asset with many parts or if you want certain objects to always be selected tothether you can parent them to one object.
- o Firstly you will always have the site and the import first on the top of the heirarchy below the scene graph component. When you right click on a component a dropdown menu shows up. There are some important features in this menu that can make your workflow more efficient.
 - The **Add to user library** option has to do with the asset library. In the asset library the last folder is the **User Library**. This is where you can save custom assets or downloaded assets from the internet. You can save 3D objects here as well as Materials.
 - One important thing to note is that before saving a 3D asset try to make sure that the Gizmo is somewhat cented on that object. The gizmo is the thing you use to transform an object. If it is on the other side of the map is will become hard to drag and drop the object wherever you want to.
 - Fixing the gizmo can be a little bit complicated but I will include a link on how to do it in Blender. https://www.youtube.com/watch?v=q_SiM8PIXtl https://www.youtube.com/watch?v=q_SiM8PIXtl
 - Once you have the gizmo/origin set up make sure it is placed in the center of the world before you import into Twinmotion. If there are any additional questions about blender there is lots of documentation online. **THIS IS ONLY A WORK AROUND IF YOU IMPORT AN ASSET THAT WAS SET UP POORLY.** With professional assets this should not be an issue but assets downloaded from the internet are not always set up correctly.
 - One other thing I will quickly point out is that you can change the way materials are on an object easily in blender. I will add a link to a video on how to do that as well. If you have a sketchup model that does not have the materials separated correctly then you can assign materials to faces easily in blender. <https://www.youtube.com/watch?v=ms89wP8m4ZU>
- o Once an object is added to the user library you can organize them in folders and they will stay in your library even when you make new projects so you wont have to add them multiple times. Note that this feature of not having to reupload is only avaiable with the full version of twinmotion.
- o If you want to make a new folder in the heirarchy you can right click anywhere or on the folder you want to add a subfolder in and then select **New Container**. This will make a new folder that you can then name.
- o You can easitly replace objects in Twinmotion. If you have a beach umbrella model that is open and one that is closed you can replace the closed one with an opened one easily with only a few clicks. All you have to do is right click on the object you want to replace in the heirarchy then select **replace object**. Continue to drag the replacement asset into the bottom menu and click **start replacment**. You can replace other assets by just clicking on them in or out of the heirarchy and then pressing the start replacment button.
- o The another cool tool that the heirarchy menu has is being able to change the **active container**. By default the active container is the Scene Graph. Active container means that whenever you add assets to the scene from the asset library in the hierarchy they will be placed in the active container. If you are working on lighting and want to keep all of the lights in a single folder then set that folder as the active container and they will automatically be placed there. (Dont forget what your active container is if you change it. Your workflow can get disrupted this way.

- o A useful tool in the heirarchy menu that I use at times is the Isolation Button. This can be used by right clicking an item in the heirarchy and selecting **Isolate On/Off**. This makes the selected object the only visible asset in the environment.
- o One of the most important functions of the heirarchy that keeps Twinmotion running smoothly are iterations or instances of assets. When you make an instance of an asset you are essentially making a duplicate except for the fact if you change ANY of the parameters on one asset, the parameter will change amoung all of the assets within a single instance. This makes it so the engine doesn't use as much memory and you can easily keep things uniform throughout the document. I use instanceing a lot with lights especially since they already take up a lot of memory.
- o You can instance an asset by right clicking it and clicking **copy**. You then go to the folder you want to instance inside of and right click again. You then select **paste here**. A popup will then appear that asks if you want to instance the asset or copy it. If you want to **instance** the asset then you click instance and it will appear in the folder with a color next to the name. If you select copy then the asset will not instance and just make a copy which can also be used but does not save memory.
- o If you made an instance of an asset but realize that you want to change one asset in the instance without changing all of the others then you have to right click on that asset in the heirarchy and select **break instance**. This will break away that one asset from the instance and make it seperate from the rest and give you the ability top freely change it without messing with the rest of the assets.

THE EYE MENU

- o There are a few specific things that the eye menu can be used for. It is supposed to speed up workflow and make visualization faster.
- o The time of day icon which looks like a sun makes it easy to change the time of day. This is much faster than going into the locations menu. You can easily visualise how the scene looks at different times this way.
- o The speed icon looks like a speedometer. This changes the speed at which you move through the world. I have also found the **Hotkeys** for speed which are **1, 2, and 3**. 1 being the slowest and 3 being the fastest. The different speeds are supposed to represent on foot, on bike, and in car.
- o The viewport and movement options icon looks like the eye of the original menu.
 - The first icon that is shaped like a camera takes a screenshot of your viewport. This is a very rough scrennshot and should not be used for final renders. This picture is automatically saved to the desktop.
 - The next icon represents walking mode or to the floor. In this mode you cannot fly around the scene and only walk. Also sounds of the materials you are walking on can be heard and you cannot walk through walls. showing where you need to place opening doors or add an animator to doors already existing.
 - You can go back to the pedestrian button but it has turned into a helicopter icon. This means that you can click the helicopter to go back to flying mode.
 - The last mode is presentation mode. This simulates what the document would look like if you exported it as a presenter file. it becomes a bit more simple.

- o Next you see an icon of a house. This is the views option. It shows many different orthographic views of the world and model. This may be useful for the construction side of things.



- o The clipping option goes along with the views option. This clips the view so that you can see different parts of the building or landscape. <https://www.youtube.com/watch?v=jHQJJHUUZAc&feature=youtu.be>
- o The last icon is the VR icon. This turns on **BIMmotion VR mode** so that you can view the model in VR.

FINAL STATEMENTS (WRAPPING UP)

- o Useful sources for information, documentation, and video tutorials will be linked here
- o The Twinmotion youtube channel is unlisted but can be accessed by clicking F1 on your keyboard while inside of twinmotion. I will also link the channel here. <https://www.youtube.com/user/twinmotion>
- o Linked here is the Twinmotion forums. You can find questions and answers here all about twinmotion. If you are having an issue check out the forums to see if anyone else is having the same problem or post a question so the DEVs know they have a problem they need to fix. https://twinmotionhelp.epicgames.com/s/?language=en_US
- o Linked here is the Unreal Architecture Page for both Unreal Engine and Twinmotion <https://www.unrealengine.com/en-US/architecture-solution>
- o Lastly I will add a discord link. This is for the Unreal Slackers discord channel run by epic games and DEVs that for for them. They have some great conversations about different industries and UEdatasmith here so I'll add a link here. (<https://discord.gg/unreal-slackers>)- copy this link and put it in your discord to join the chat