I have scoured the internet for a tutorial on making custom shipsets, and the closest I could find was out-of-date forum posts and broken links. The general opinion seems to be that making shipsets is an arduous, byzantine and downright impossible process.

Not so. The pieces are far flung and obscure, but they are there, and I have brought them together to create an updated custom shipset tutorial for Stellaris that does not require expensive software or years of modding experience.

This tutorial was written for Stellaris version *Shelley v2.5.1.*

What you'll need:

- Google Chrome
- JoroDox Tools: An applet that installs to your chrome browser. **Essential.**
- A text editor. I recommend Notepad++, as it formats code in text files and can have multiple files open in tabs.
- Blender, a free 3D modelling program with native .dae support.
- An image editor that can edit .dds files. I personally use Photoshop, but there are free programs, such as GIMP.
    - Photoshop requires a .dds plugin to save into the right format, available here
    - Gimp has one too, available here.

While not strictly necessary, I highly recommend downloading my example mod folder, as the tutorial assumes you are using the folder structure.

It can be downloaded here.

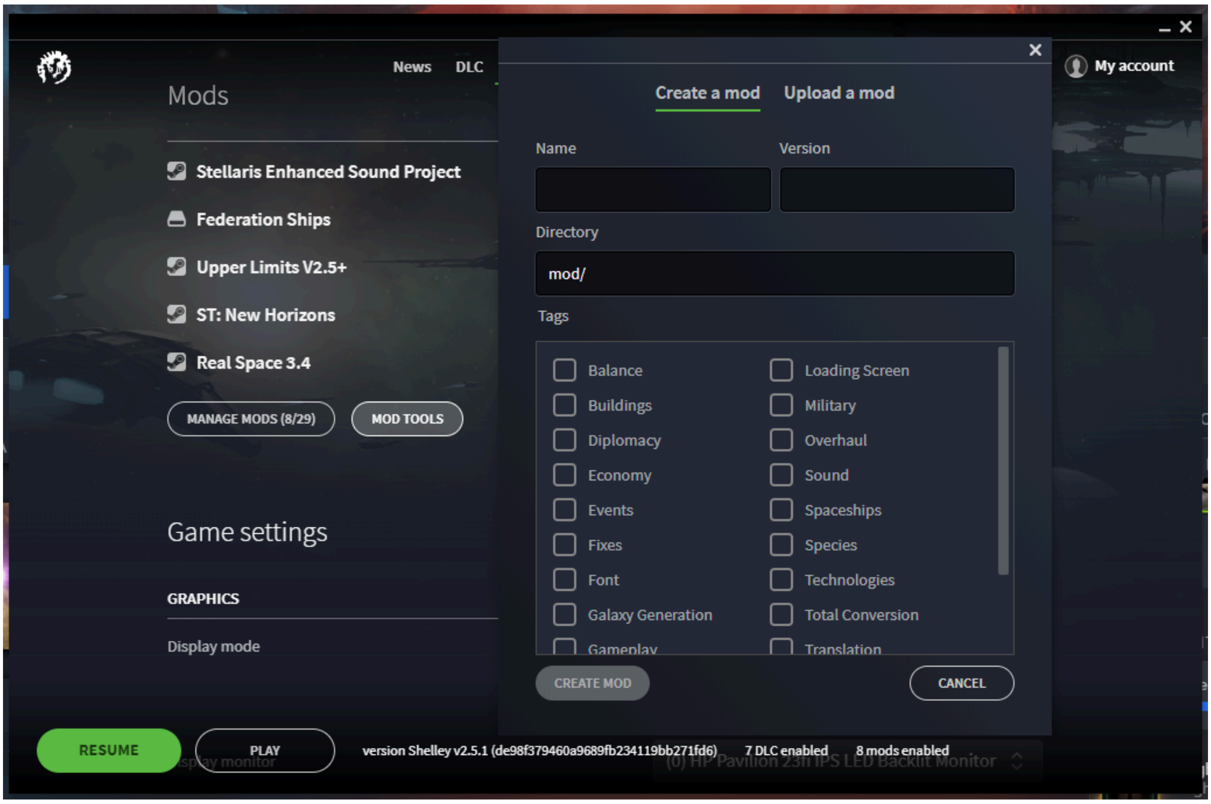
Alternatively, it is available as a Steam Workshop mod, and you can copy its contents from your workshop folder, but it may take some looking around for.

Contents:

This tutorial will progress in a step-by-step process for creating a new shipset from scratch. This is not a tutorial on 3D modelling. Modelling, textures; this tutorial assumes you have them already prepared. I'm using Blender because it is both free, and capable of importing and exporting in many formats.

Step One: Preparing the game files.

First you will want to create a local mod. Launch the Stellaris Launcher and scroll to the Mods section. Click on the Mod Tools button.



Name:

Version:

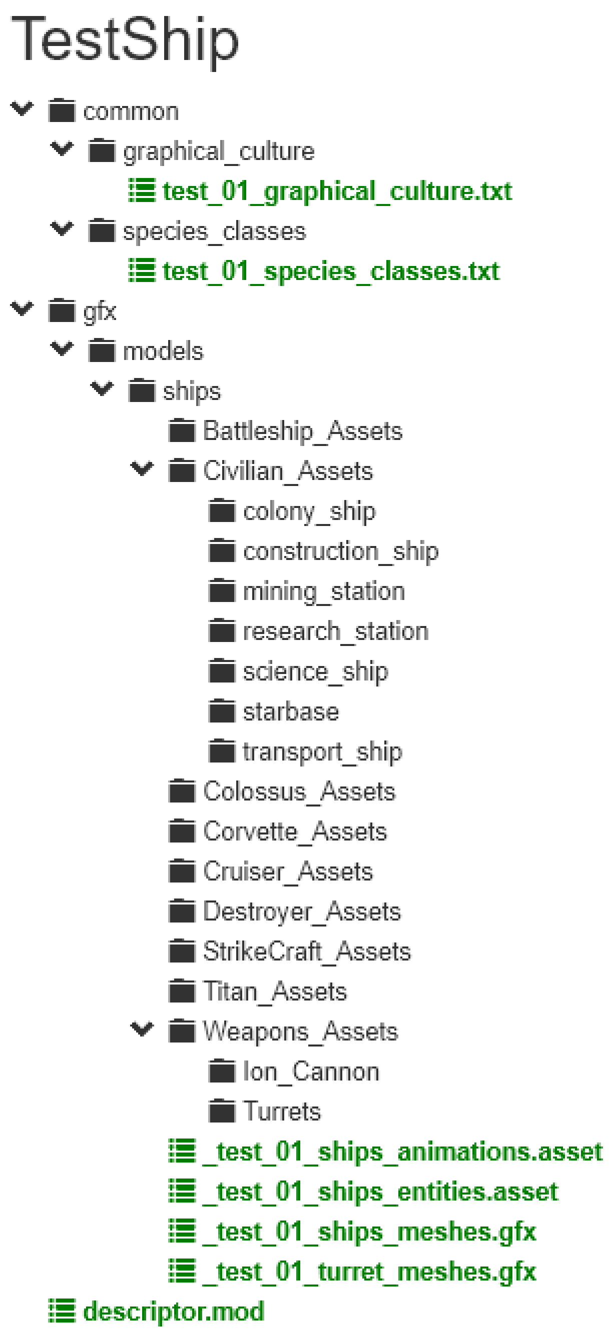
Directory: mod/

version Shelley v2.5.1 (de98f379460a9689fb234119bb271fd6) 7 DLC enabled 8 mods enabled

Name your mod whatever you want and pick whichever tags you need. I recommend ‘spaceships’ and ‘graphics’. Press the create mod button, and enable your mod.

Now navigate to your mods folder. On my computer (Windows 10) it is in /Documents/Paradox_Interactive/Stellaris/mod. You will find your new mod has a folder here. I recommend downloading my template file, which will give you everything you need to start editing, and extracting its contents to this folder.

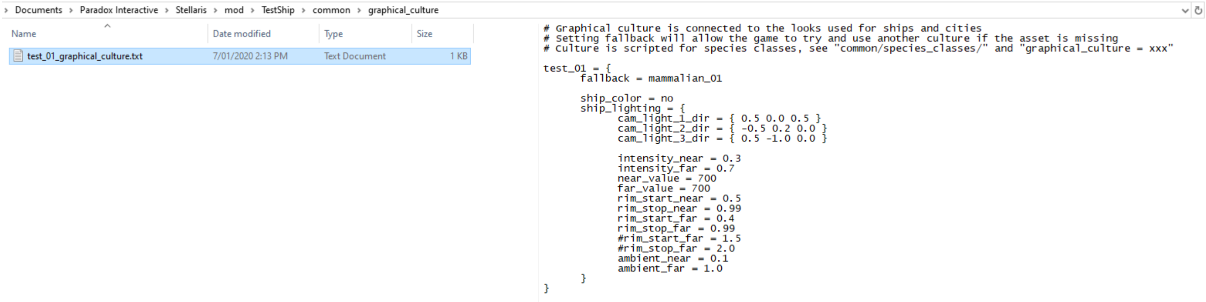
Your file structure should look like this:



```
TestShip
common
    graphical_culture
        test_01_graphical_culture.txt
    species_classes
        test_01_species_classes.txt
gfx
    models
        ships
            Battleship_Assets
            Civilian_Assets
                colony_ship
                construction_ship
                mining_station
                research_station
                science_ship
                starbase
                transport_ship
            Colossus_Assets
            Corvette_Assets
            Cruiser_Assets
            Destroyer_Assets
            StrikeCraft_Assets
            Titan_Assets
            Weapons_Assets
                Ion_Cannon
                Turrets
            _test_01_ships_animations.asset
            _test_01_ships_entities.asset
            _test_01_ships_meshes.gfx
            _test_01_turret_meshes.gfx
descriptor.mod
```

Graphical Culture:

Replace ‘test_01’ with whatever shorthand you want for your mod. ‘Alpha_01’, ‘dog_01’, ‘asdf_01’, it doesn’t matter, so long as you are consistent. Whatever you replace ‘test_01’ with, you will need to replace every instance of it with the same thing.



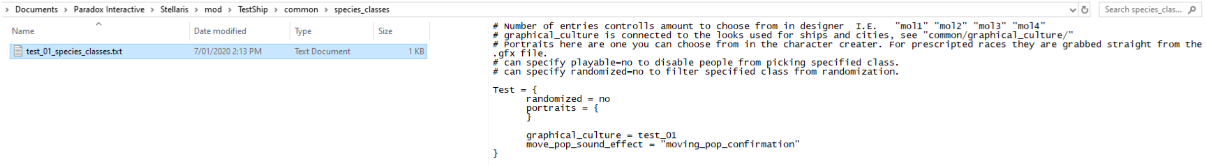
Documents › Paradox Interactive › Stellaris › mod › TestShip › common › graphical_culture
Name
Date modified
Type
Size
test_01_graphical_culture.txt
7/01/2020 2:13 PM
Text Document
1 KB

```
# Graphical culture is connected to the looks used for ships and cities
# Setting fallback will allow the game to try and use another culture if the asset is missing
# Culture is scripted for species classes, see "common/species_classes/" and "graphical_culture = xxx"

test_01 = {
	fallback = mammalian_01

	ship_color = no
	ship_lighting = {
		cam_light_1_dir = { 0.5 0.0 0.5 }
		cam_light_2_dir = { -0.5 0.2 0.0 }
		cam_light_3_dir = { 0.5 -1.0 0.0 }

		intensity_near = 0.3
		intensity_far = 0.7
		near_value = 700
		far_value = 700
		rim_start_near = 0.5
		rim_stop_near = 0.99
		rim_start_far = 0.4
		rim_stop_far = 0.99
		#rim_start_far = 1.5
		#rim_stop_far = 2.0
		ambient_near = 0.1
		ambient_far = 1.0
	}
}
```

You can leave everything else in this file as it is, unless you want to change the fallback shipset to another type.

Species Classes:

Replace ‘TestFull’ with anything. Then replace the “test_01” with whatever you named them.



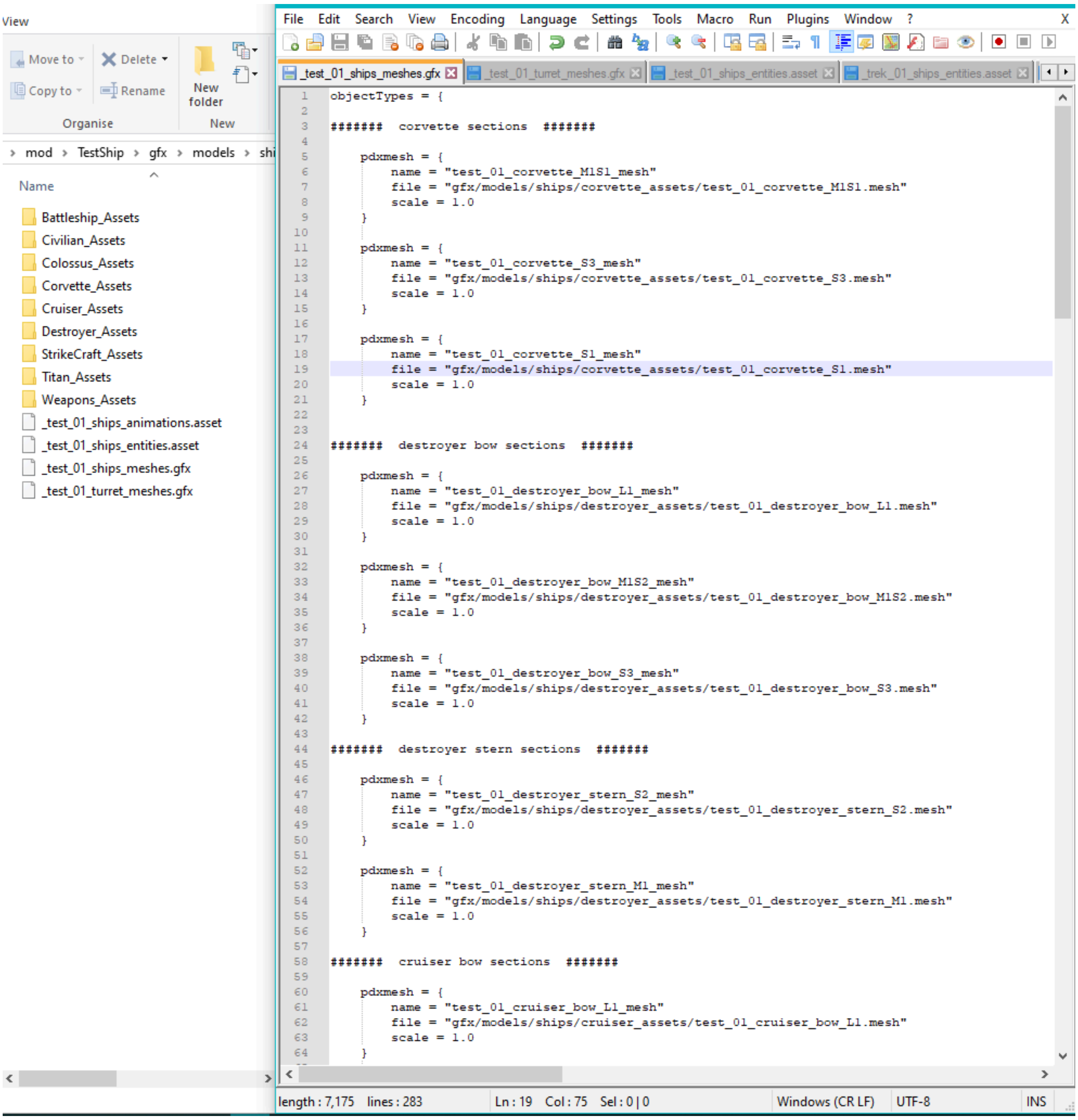
Documents › Paradox Interactive › Stellaris › mod › TestShip › common › species_classes
Search species_clas...
Name
Date modified
Type
Size
test_01_species_classes.txt
7/01/2020 2:13 PM
Text Document
1 KB

```
# Number of entries controlls amount to choose from in designer  I.E.   "mol1" "mol2" "mol3" "mol4"
# graphical_culture is connected to the looks used for ships and cities, see "common/graphical_culture/"
# Portraits here are one you can choose from in the character creater. For prescripted races they are grabbed straight from the
.gfx file.
# can specify playable=no to disable people from picking specified class.
# can specify randomized=no to filter specified class from randomization.

Test = {
	randomized = no
	portraits = {
	}

	graphical_culture = test_01
	move_pop_sound_effect = "moving_pop_confirmation"
}
```

GFX/Models/Ships:

Here you will have four files, two .asset, two .gfx. Open them all in your text editor. My prepared files will have everything set up for you, save for the specifics of the meshes and locators. For now, simply replace all instances of ‘test_01’ with the same prefix you used for the graphical culture. Ctrl+F and Replace All is your friend.

Remember, only replace ‘test_01’: leave anything else. Humanoid_01, Molluscoid_01, Arthropod_01 — only replace ‘test_01’.


View
Move to
Delete
Copy to
Rename
New folder
Organise
New
mod › TestShip › gfx › models › shi
Name
File Edit Search View Encoding Language Settings Tools Macro Run Plugins Window ?
_test_01_ships_meshes.gfx
_test_01_turret_meshes.gfx
_test_01_ships_entities.asset
_trek_01_ships_entities.asset
length : 7,175 lines : 283 Ln : 19 Col : 75 Sel : 0 | 0 Windows (CR LF) UTF-8 INS

```
Battleship_Assets
Civilian_Assets
Colossus_Assets
Corvette_Assets
Cruiser_Assets
Destroyer_Assets
StrikeCraft_Assets
Titan_Assets
Weapons_Assets
_test_01_ships_animations.asset
_test_01_ships_entities.asset
_test_01_ships_meshes.gfx
_test_01_turret_meshes.gfx
```

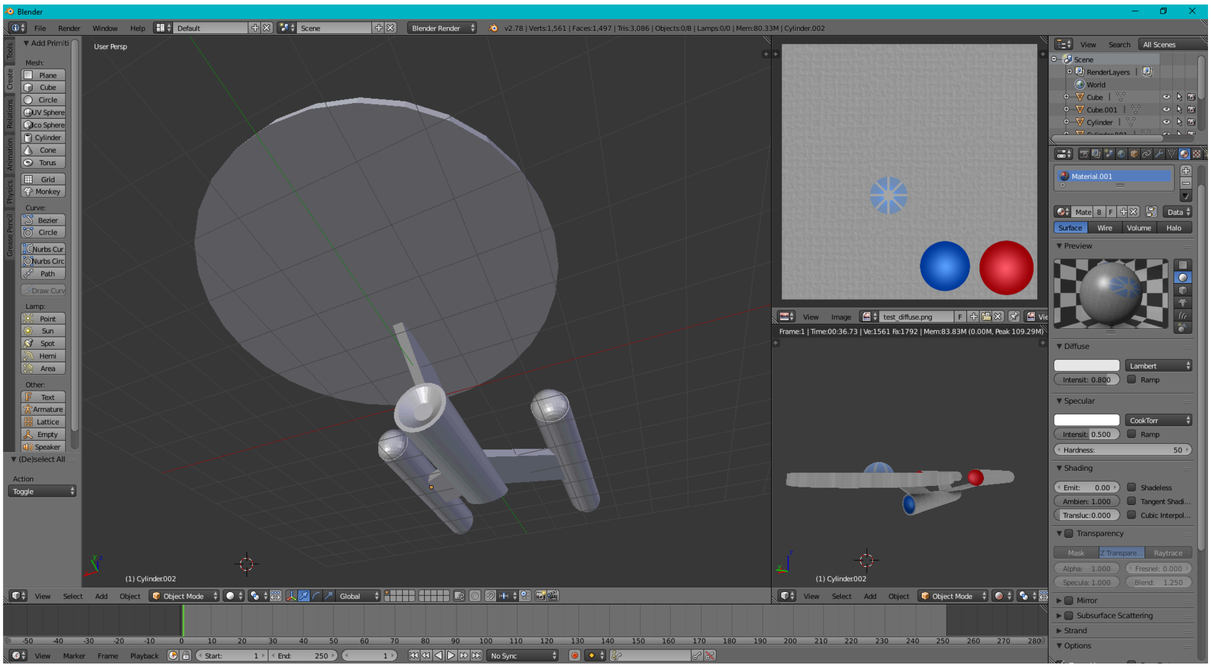
```
objectTypes = {

#######  corvette sections  #######

    pdxmesh = {
        name = "test_01_corvette_M1S1_mesh"
        file = "gfx/models/ships/corvette_assets/test_01_corvette_M1S1.mesh"
        scale = 1.0
    }

    pdxmesh = {
        name = "test_01_corvette_S3_mesh"
        file = "gfx/models/ships/corvette_assets/test_01_corvette_S3.mesh"
        scale = 1.0
    }

    pdxmesh = {
        name = "test_01_corvette_S1_mesh"
        file = "gfx/models/ships/corvette_assets/test_01_corvette_S1.mesh"
        scale = 1.0
    }


#######  destroyer bow sections  #######

    pdxmesh = {
        name = "test_01_destroyer_bow_L1_mesh"
        file = "gfx/models/ships/destroyer_assets/test_01_destroyer_bow_L1.mesh"
        scale = 1.0
    }

    pdxmesh = {
        name = "test_01_destroyer_bow_M1S2_mesh"
        file = "gfx/models/ships/destroyer_assets/test_01_destroyer_bow_M1S2.mesh"
        scale = 1.0
    }

    pdxmesh = {
        name = "test_01_destroyer_bow_S3_mesh"
        file = "gfx/models/ships/destroyer_assets/test_01_destroyer_bow_S3.mesh"
        scale = 1.0
    }

#######  destroyer stern sections  #######

    pdxmesh = {
        name = "test_01_destroyer_stern_S2_mesh"
        file = "gfx/models/ships/destroyer_assets/test_01_destroyer_stern_S2.mesh"
        scale = 1.0
    }

    pdxmesh = {
        name = "test_01_destroyer_stern_M1_mesh"
        file = "gfx/models/ships/destroyer_assets/test_01_destroyer_stern_M1.mesh"
        scale = 1.0
    }

#######  cruiser bow sections  #######

    pdxmesh = {
        name = "test_01_cruiser_bow_L1_mesh"
        file = "gfx/models/ships/cruiser_assets/test_01_cruiser_bow_L1.mesh"
        scale = 1.0
    }
```

Do not edit anything else yet. It can wait.

Step Two: Preparing the 3D Model for Export.

A ‘map’ is a 2D image that is wrapped around a 3D model to provide information. A diffuse map is more commonly known as a texture, and is what determines its appearance.

Take your model and import it into Blender.



v2.78 | Verts:1,561 | Faces:1,497 | Tris:3,086 | Objects:0/8 | Lamps:0/0 | Mem:80.33M | Cylinder.002

Frame:1 | Time:00:36.73 | Ve:1561 Fa:1792 | Mem:83.83M (0.00M, Peak 109.29M)

Intensit: 0.800

Intensit: 0.500

Hardness: 50

Emit: 0.00

Ambien: 1.000

Translu: 0.000

Alpha: 1.000

Fresnel: 0.000

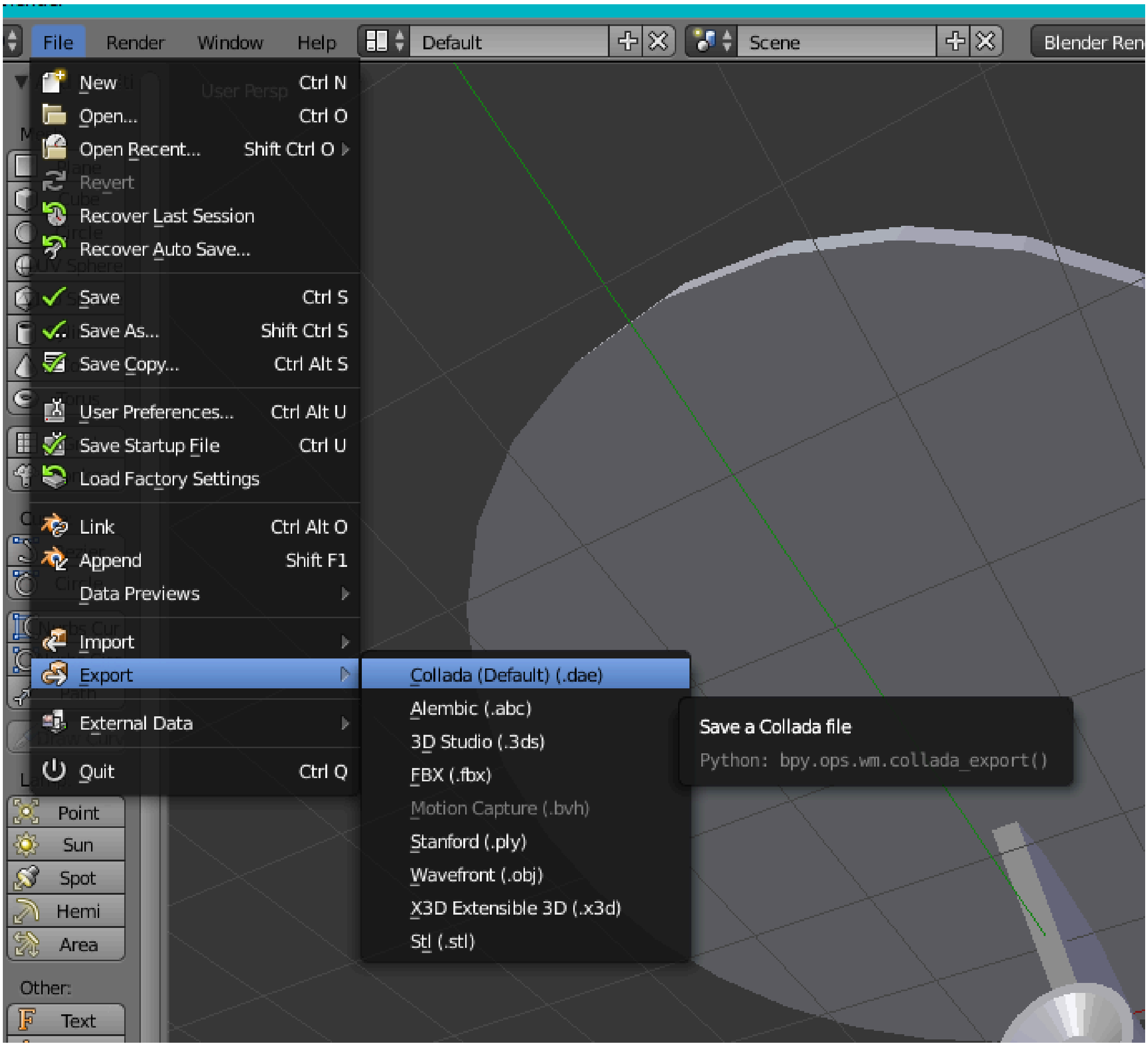
Specula: 1.000

Blend: 1.250

Start: 1

End: 250

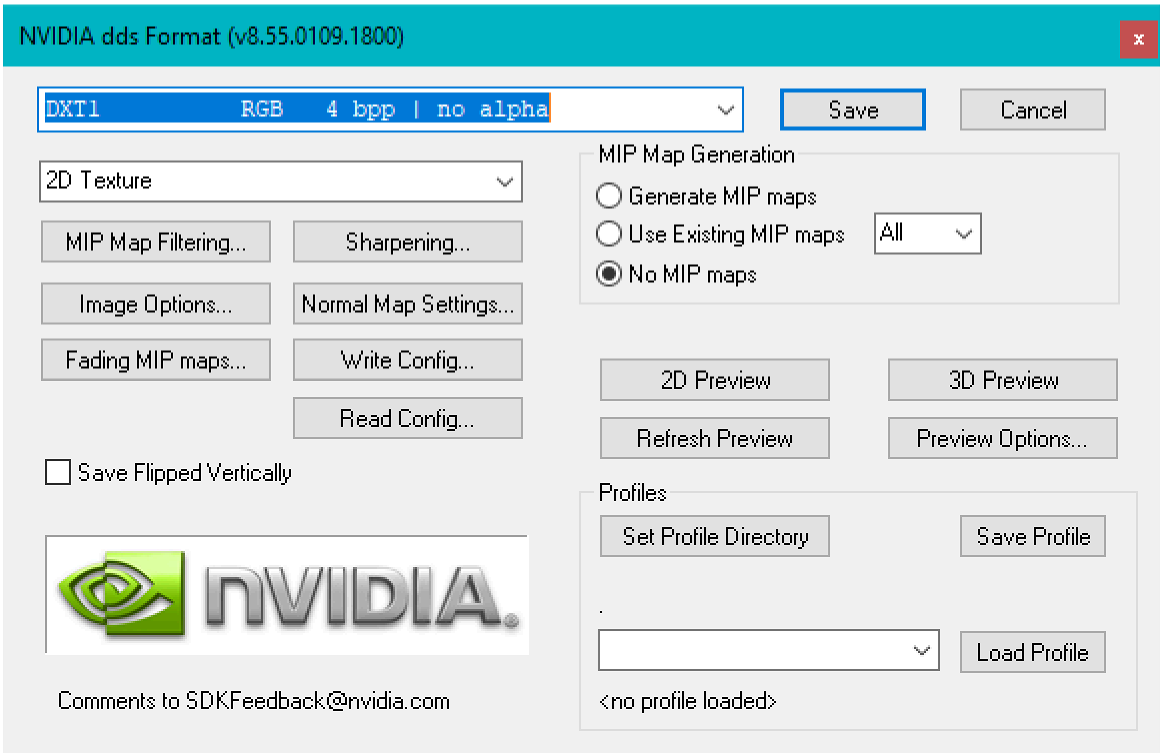
Once the model is ready, go to File, Export, Collada (default) (.dae), and export the model to your ‘ships’ folder in your new mod folder.



Save a Collada file

```
Python: bpy.ops.wm.collada_export()
```

You will also need to prepare your model’s textures. Open the image in your image editor, and save it as a .dds file. There is a photoshop plugin that exports in .dds, and these are the settings I use.



NVIDIA dds Format (v8.55.0109.1800)

DXT1 RGB 4 bpp | no alpha

2D Texture

MIP Map Generation

○ Generate MIP maps

○ Use Existing MIP maps — All

● No MIP maps

□ Save Flipped Vertically

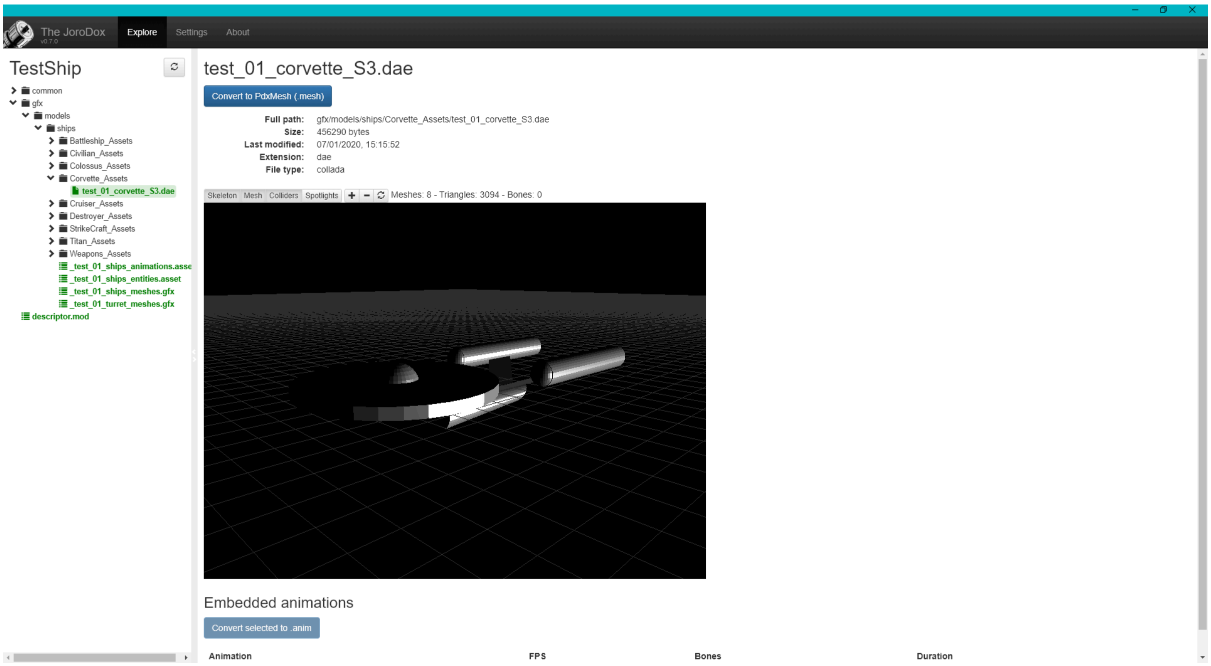
Comments to SDKFeedback@nvidia.com

Profiles

<no profile loaded>

Step Three: Using JoroDox

In the settings tab of JoroDox, select the mod directory where you have exported the .dae file of your model. Then go into the Explore tab. On the left will be a breakdown of the directory. Find your .dae model and click on it.



The JoroDox v0.7.0

TestShip

- common
- gfx
  - models
    - ships
      - Battleship_Assets
      - Civilian_Assets
      - Colossus_Assets
      - Corvette_Assets
        - test_01_corvette_S3.dae
      - Cruiser_Assets
      - Destroyer_Assets
      - StrikeCraft_Assets
      - Titan_Assets
      - Weapons_Assets
      - _test_01_ships_animations.asse
      - _test_01_ships_entities.asset
      - _test_01_ships_meshes.gfx
      - _test_01_turret_meshes.gfx
- descriptor.mod

test_01_corvette_S3.dae

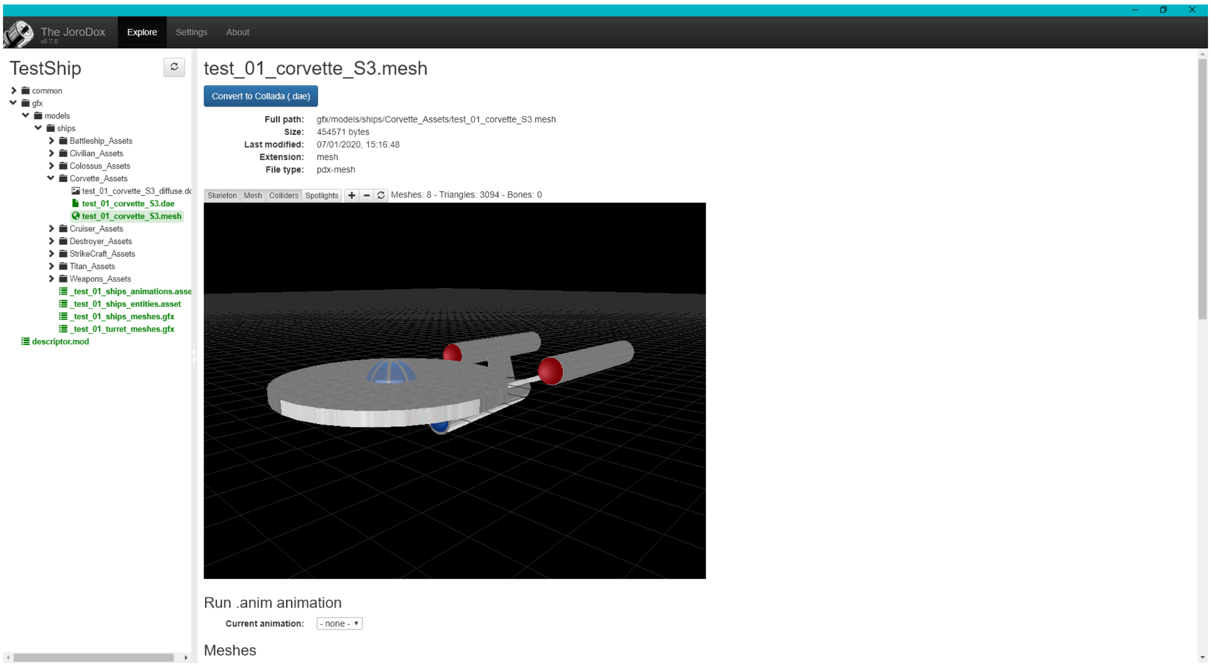
Full path:	gfx/models/ships/Corvette_Assets/test_01_corvette_S3.dae
Size:	456290 bytes
Last modified:	07/01/2020, 15:15:52
Extension:	dae
File type:	collada

Meshes: 8 - Triangles: 3094 - Bones: 0

Embedded animations

Animation	FPS	Bones	Duration

Now press the big blue Convert to PdxMesh (.mesh) button. This will create a .mesh file.



test_01_corvette_S3.mesh

Full path: gfx/models/ships/Corvette_Assets/test_01_corvette_S3.mesh
Size: 454571 bytes
Last modified: 07/01/2020, 15:16:48
Extension: mesh
File type: pdx-mesh

Meshes: 8 - Triangles: 3094 - Bones: 0

Run .anim animation

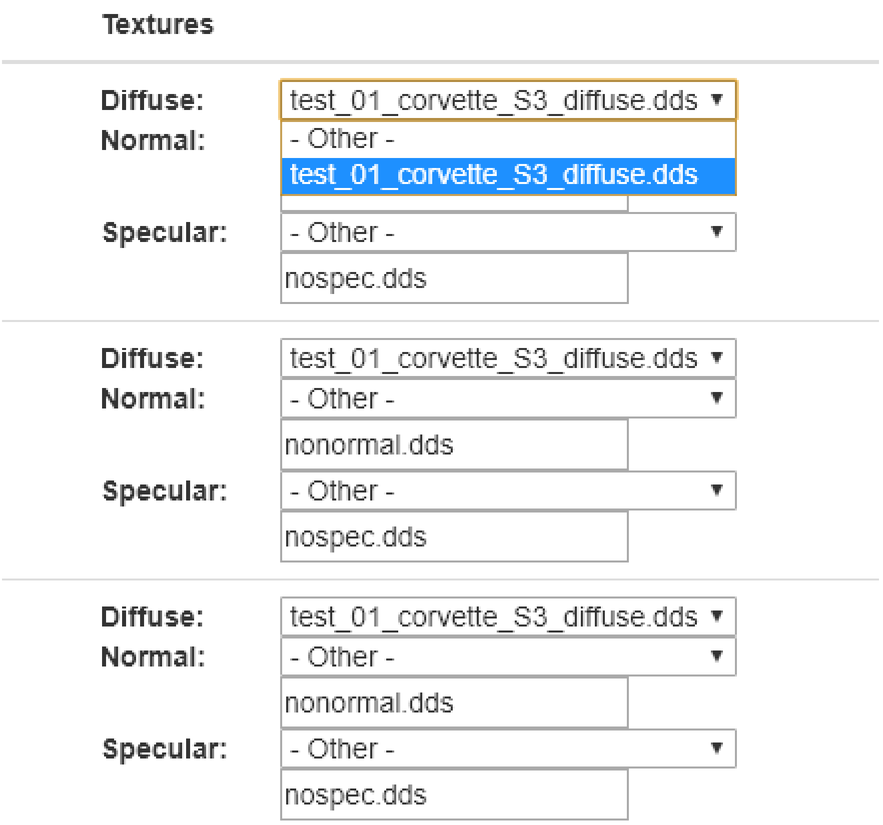
Current animation: - none -

Meshes

Scroll down and you will see two headings. You can ignore the “run .anim animation” section for now, what we want to focus on is the meshes section.

Depending on the amount of objects in your 3D model, you will have that many meshes. The textures section has three dropdown menus. The contents of these drop downs will be any .dds files in the directory.

Make the Diffuse selection your texture .dds file. You can either select it from the drop down, or select -Other- and type the name of the file in the input box that will appear.



Textures

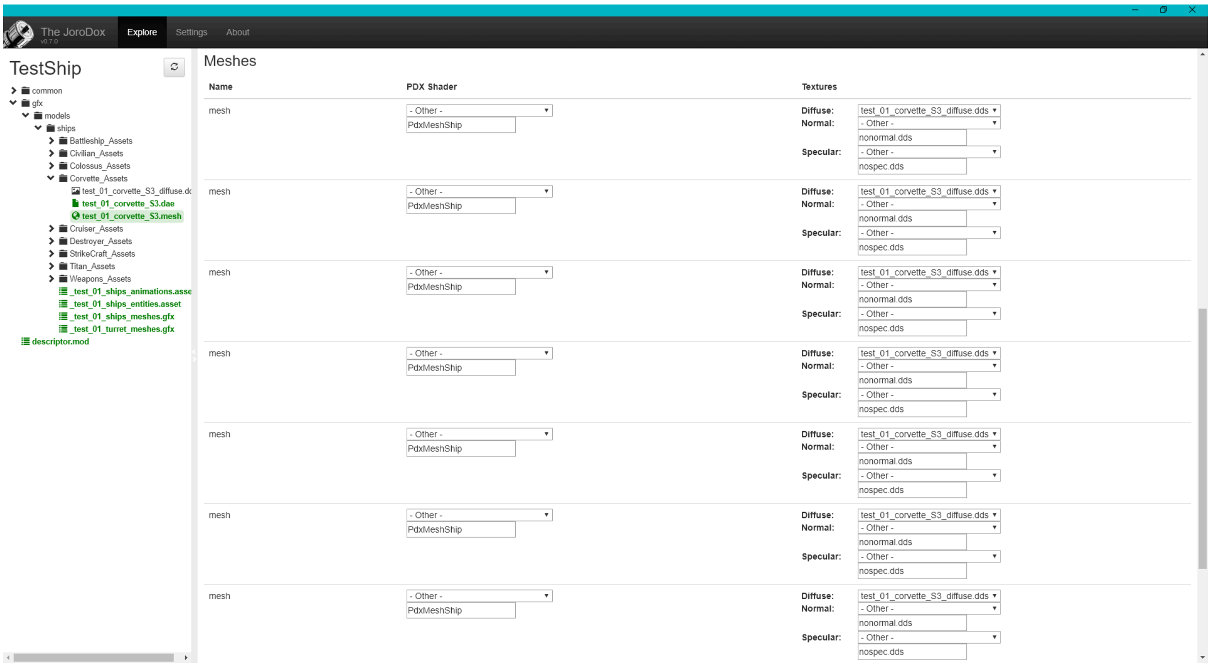
Diffuse: test_01_corvette_S3_diffuse.dds ▾
Normal:
Specular: - Other - ▾
nospec.dds

Diffuse: test_01_corvette_S3_diffuse.dds ▾
Normal: - Other - ▾
nonormal.dds
Specular: - Other - ▾
nospec.dds

Diffuse: test_01_corvette_S3_diffuse.dds ▾
Normal: - Other - ▾
nonormal.dds
Specular: - Other - ▾
nospec.dds

Do the same for the normal and specular maps your model uses. If your model does not have any, or you don’t know what those mean, just put ‘nonormal.dds’ and ‘nospec.dds’ in the normal and specular sections.

Now change the Shader selections for all meshes to -Other- and type “PdxMeshShip” in the input box for each of them. In the end it should look something like this:



TestShip

```
common
gfx
  models
    ships
      Battleship_Assets
      Civilian_Assets
      Colossus_Assets
      Corvette_Assets
        test_01_corvette_S3_diffuse.dc
        test_01_corvette_S3.dae
        test_01_corvette_S3.mesh
      Cruiser_Assets
      Destroyer_Assets
      StrikeCraft_Assets
      Titan_Assets
      Weapons_Assets
      _test_01_ships_animations.asse
      _test_01_ships_entities.asset
      _test_01_ships_meshes.gfx
      _test_01_turret_meshes.gfx
  descriptor.mod
```

Meshes

Name	PDX Shader	Textures
mesh	- Other - PdxMeshShip	Diffuse: test_01_corvette_S3_diffuse.dds Normal: - Other - nonormal.dds Specular: - Other - nospec.dds
mesh	- Other - PdxMeshShip	Diffuse: test_01_corvette_S3_diffuse.dds Normal: - Other - nonormal.dds Specular: - Other - nospec.dds
mesh	- Other - PdxMeshShip	Diffuse: test_01_corvette_S3_diffuse.dds Normal: - Other - nonormal.dds Specular: - Other - nospec.dds
mesh	- Other - PdxMeshShip	Diffuse: test_01_corvette_S3_diffuse.dds Normal: - Other - nonormal.dds Specular: - Other - nospec.dds
mesh	- Other - PdxMeshShip	Diffuse: test_01_corvette_S3_diffuse.dds Normal: - Other - nonormal.dds Specular: - Other - nospec.dds
mesh	- Other - PdxMeshShip	Diffuse: test_01_corvette_S3_diffuse.dds Normal: - Other - nonormal.dds Specular: - Other - nospec.dds
mesh	- Other - PdxMeshShip	Diffuse: test_01_corvette_S3_diffuse.dds Normal: - Other - nonormal.dds Specular: - Other - nospec.dds

Once you’ve set all meshes and shaders, you can press the save mesh changes to file button at the bottom. You will be left with a .mesh file that you can now bring into the game. However, there is still more to do.

Depending on which section of which tier of ship, be it a corvette, or the front of a battleship, you will want to change the name of the .mesh file to match the table below. This will correspond with an entry in the ships_meshes.gfx file.

	Corvette	
_corvette_S3		
_corvette_M1S1		
_corvette_S1		
	Destroyer	
_destroyer_bow_L1	_destroyer_stern_S2	
_destroyer_bow_M1S2	_destroyer_stern_M1	
_destroyer_bow_S3		
	Cruiser	
_cruiser_bow_L1	_cruiser_mid_S2HB	_cruiser_stern_M1
_cruiser_bow_M1S2	_cruiser_mid_L1M1	_cruiser_stern_S2
_cruiser_bow_M2	_cruiser_mid_M3	
	_cruiser_mid_M2S2	

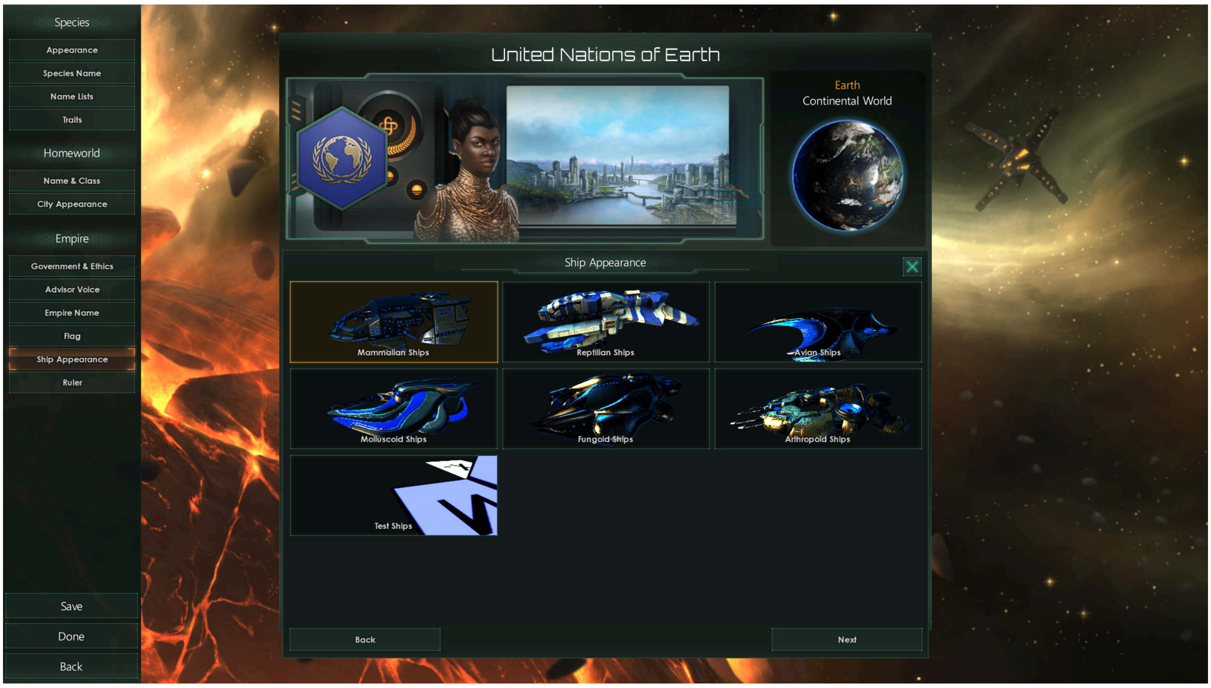
Battleship		
_battleship_bow_L1M1S2	_battleship_mid_L1M4	_battleship_stern_L1
_battleship_bow_L1S4	_battleship_mid_L2M2	_battleship_stern_M1S2
_battleship_bow_L2	_battleship_mid_L2S4	_battleship_stern_M2
_battleship_bow_M1S2HB	_battleship_mid_L3	_battleship_stern_S4
_battleship_bow_M2S4	_battleship_mid_M4SHB	
_battleship_bow_M3S2	_battleship_mid_S4LHB	
_battleship_bow_XL1		
Titan		
_titan_bow		
Colossus		
Strike Craft		
_bomber	_fighter	_droppod
Civilian Ships		
_science	_construction	_transport
_colony		

For the rest of this tutorial, the model I'm using will be assigned as the three small weapons corvette model. Thus, I name the .mesh file "test_01_corvette_S3.mesh".

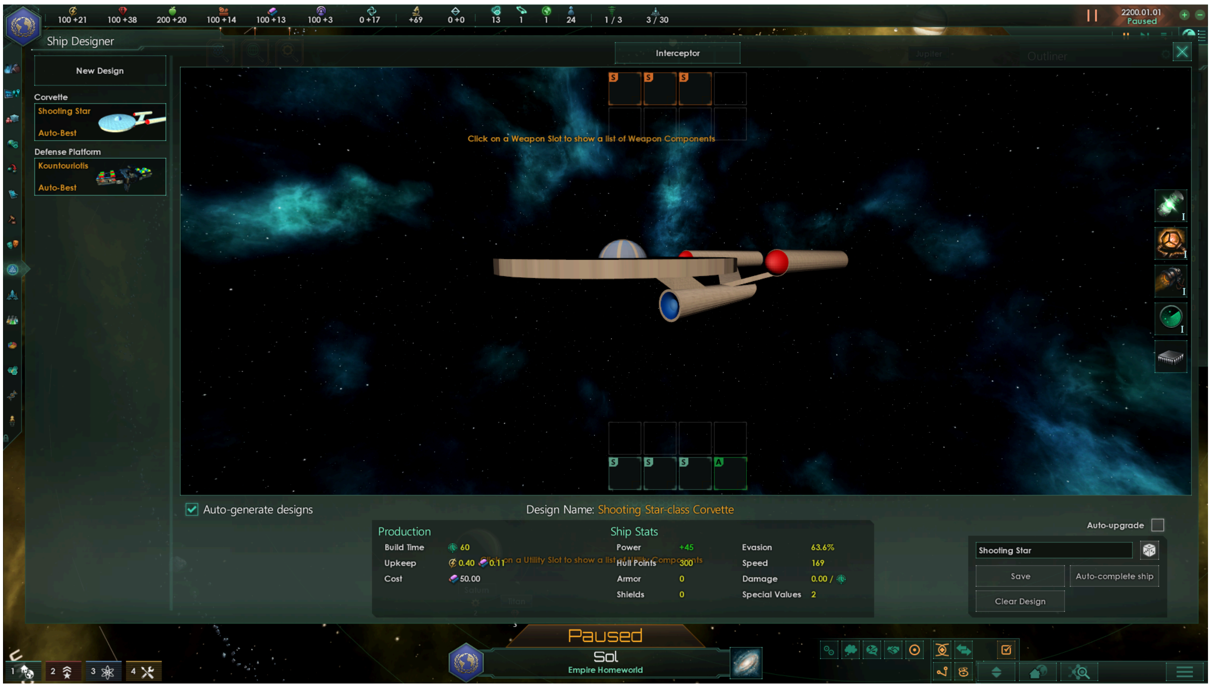
Step Four: How to Test in Game

Make sure that your mod is enabled, and all files have been saved, and all instances of "test_01" have been replaced with your culture's prefix.

Start up Stellaris and start a new game. Either edit an existing species or make a new one. If all has gone well, your new shipset should appear in the ships appearance section.



You may see a test block or vanilla ship. This will be because your shipset lacks a science ship mesh. What’s important is that you select your shipset, and start up a new game.



Click on a Weapon Slot to show a list of Weapon Components

☑ Auto-generate designs

Design Name: Shooting Star-class Corvette

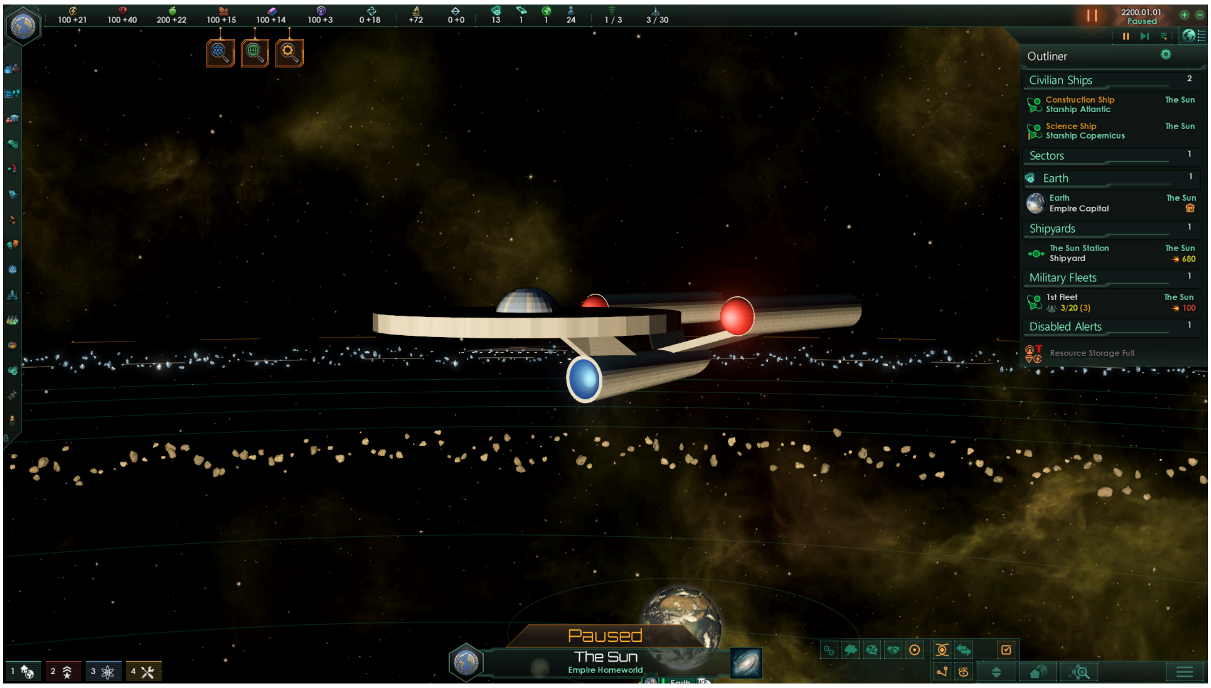
Build Time 60
Upkeep 0.40 0.11
Cost 50.00

Power +45
Hull Points 300
Armor 0
Shields 0

Evasion 63.6%
Speed 169
Damage 0.00 /
Special Values 2

I recommend using the console to give you all technologies, with the ‘research_all_technologies’ command. Use the ship designer to check if your ship component is in the game.

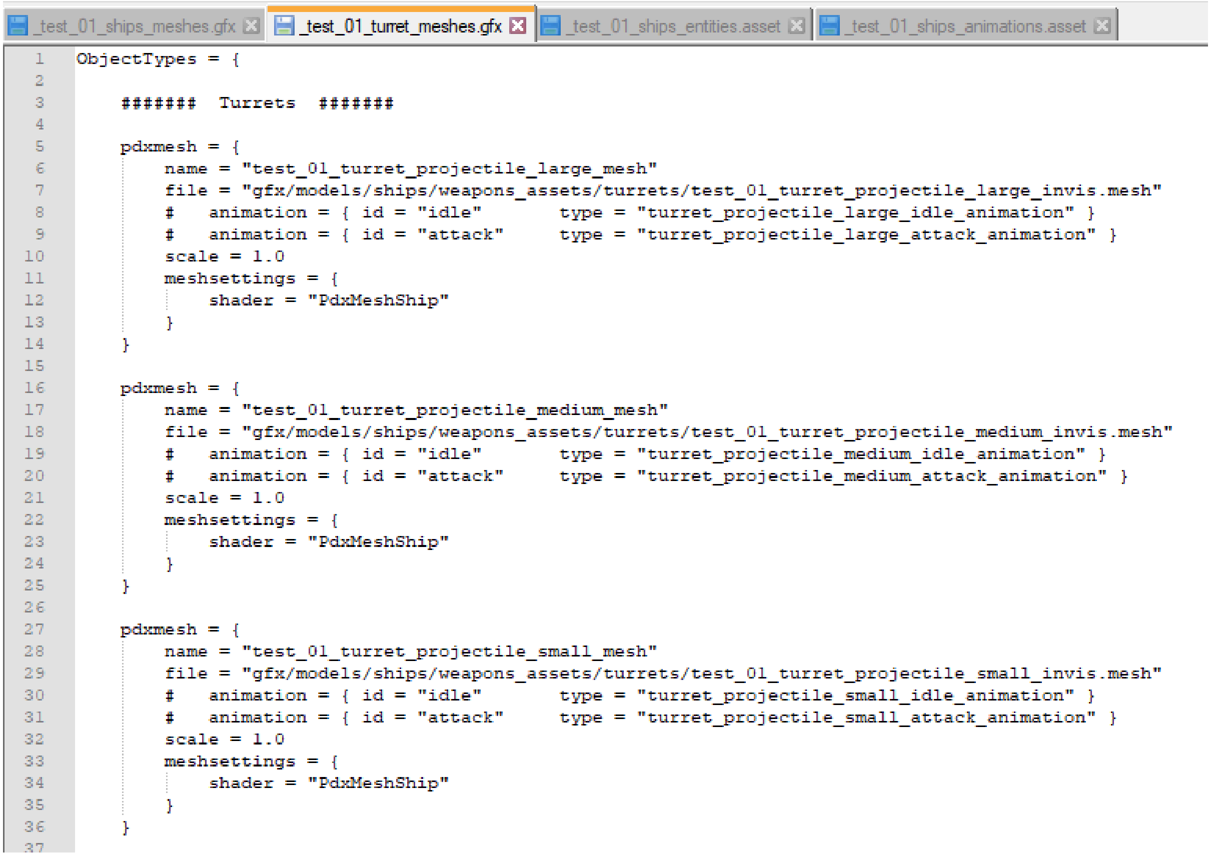
Alternatively you can use the spawn_entity command to directly spawn in your component. Use the command ‘spawnentity test_01_corvette_S3_entity’, of course replacing ‘test_01’ with your ship’s culture, and ‘corvette_s3_entity’ with the section from the ships_entities.asset file you want to test.



If all has gone well, save the game so you can jump back in quickly with the resume function, then close the game.

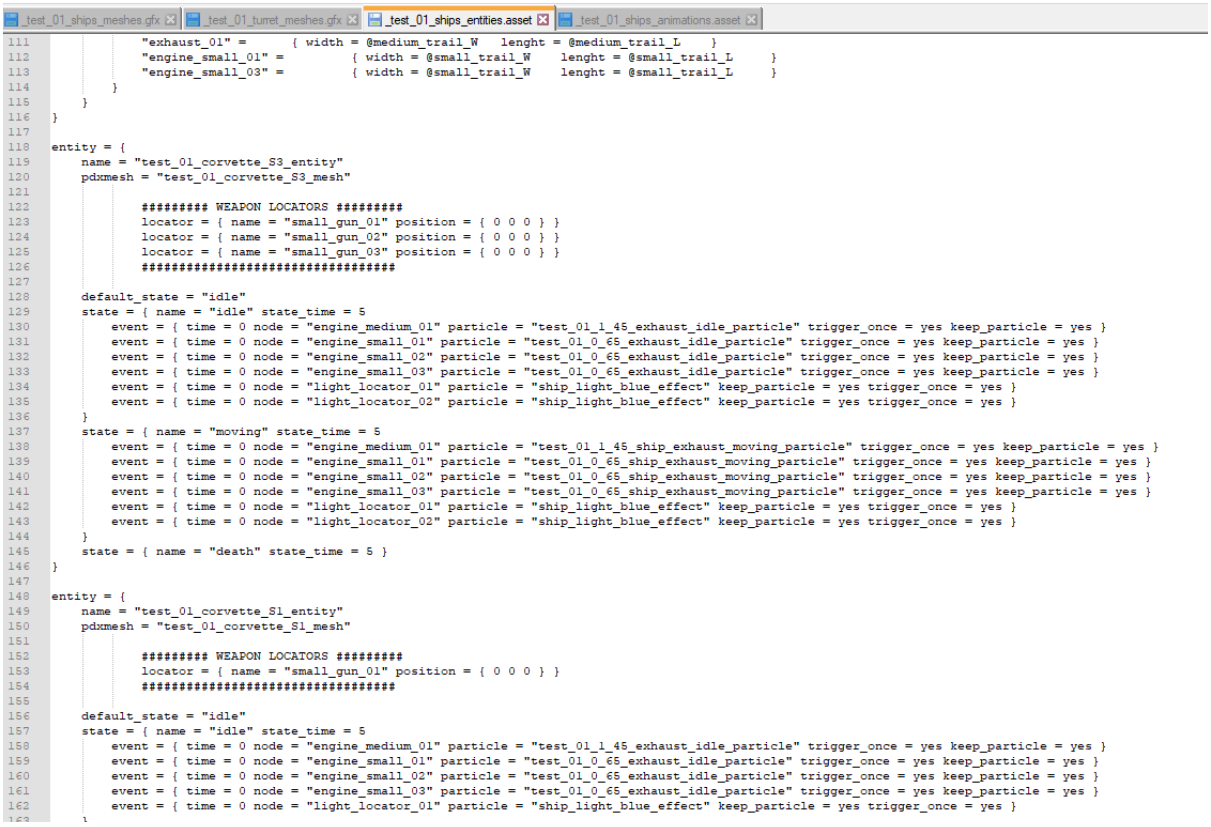
Step Five: Weapon Locators and Turrets

Open the “test_01_weapons_entities.asset” file. If you do not want physical turrets to appear on your ships, leave “test_01_turret_invis.mesh” as the file for each of the turrets. Otherwise, remove ‘_invis’ from each entry.


_test_01_ships_meshes.gfx
_test_01_turret_meshes.gfx
_test_01_ships_entities.asset
_test_01_ships_animations.asset

```
ObjectTypes = {

    #######  Turrets  #######

    pdxmesh = {
        name = "test_01_turret_projectile_large_mesh"
        file = "gfx/models/ships/weapons_assets/turrets/test_01_turret_projectile_large_invis.mesh"
        #   animation = { id = "idle"       type = "turret_projectile_large_idle_animation" }
        #   animation = { id = "attack"     type = "turret_projectile_large_attack_animation" }
        scale = 1.0
        meshsettings = {
            shader = "PdxMeshShip"
        }
    }

    pdxmesh = {
        name = "test_01_turret_projectile_medium_mesh"
        file = "gfx/models/ships/weapons_assets/turrets/test_01_turret_projectile_medium_invis.mesh"
        #   animation = { id = "idle"       type = "turret_projectile_medium_idle_animation" }
        #   animation = { id = "attack"     type = "turret_projectile_medium_attack_animation" }
        scale = 1.0
        meshsettings = {
            shader = "PdxMeshShip"
        }
    }

    pdxmesh = {
        name = "test_01_turret_projectile_small_mesh"
        file = "gfx/models/ships/weapons_assets/turrets/test_01_turret_projectile_small_invis.mesh"
        #   animation = { id = "idle"       type = "turret_projectile_small_idle_animation" }
        #   animation = { id = "attack"     type = "turret_projectile_small_attack_animation" }
        scale = 1.0
        meshsettings = {
            shader = "PdxMeshShip"
        }
    }
```

Open the “test_01_ships_entities.asset” file again. Now you can look at the weapon locators section in each entry.


_test_01_ships_meshes.gfx
_test_01_turret_meshes.gfx
_test_01_ships_entities.asset
_test_01_ships_animations.asset

```
            "exhaust_01" =      { width = @medium_trail_W   lenght = @medium_trail_L    }
            "engine_small_01" =         { width = @small_trail_W    lenght = @small_trail_L     }
            "engine_small_03" =         { width = @small_trail_W    lenght = @small_trail_L     }
        }
    }
}

entity = {
    name = "test_01_corvette_S3_entity"
    pdxmesh = "test_01_corvette_S3_mesh"

            ######### WEAPON LOCATORS #########
            locator = { name = "small_gun_01" position = { 0 0 0 } }
            locator = { name = "small_gun_02" position = { 0 0 0 } }
            locator = { name = "small_gun_03" position = { 0 0 0 } }
            ###################################

    default_state = "idle"
    state = { name = "idle" state_time = 5
        event = { time = 0 node = "engine_medium_01" particle = "test_01_1_45_exhaust_idle_particle" trigger_once = yes keep_particle = yes }
        event = { time = 0 node = "engine_small_01" particle = "test_01_0_65_exhaust_idle_particle" trigger_once = yes keep_particle = yes }
        event = { time = 0 node = "engine_small_02" particle = "test_01_0_65_exhaust_idle_particle" trigger_once = yes keep_particle = yes }
        event = { time = 0 node = "engine_small_03" particle = "test_01_0_65_exhaust_idle_particle" trigger_once = yes keep_particle = yes }
        event = { time = 0 node = "light_locator_01" particle = "ship_light_blue_effect" keep_particle = yes trigger_once = yes }
        event = { time = 0 node = "light_locator_02" particle = "ship_light_blue_effect" keep_particle = yes trigger_once = yes }
    }
    state = { name = "moving" state_time = 5
        event = { time = 0 node = "engine_medium_01" particle = "test_01_1_45_ship_exhaust_moving_particle" trigger_once = yes keep_particle = yes }
        event = { time = 0 node = "engine_small_01" particle = "test_01_0_65_ship_exhaust_moving_particle" trigger_once = yes keep_particle = yes }
        event = { time = 0 node = "engine_small_02" particle = "test_01_0_65_ship_exhaust_moving_particle" trigger_once = yes keep_particle = yes }
        event = { time = 0 node = "engine_small_03" particle = "test_01_0_65_ship_exhaust_moving_particle" trigger_once = yes keep_particle = yes }
        event = { time = 0 node = "light_locator_01" particle = "ship_light_blue_effect" keep_particle = yes trigger_once = yes }
        event = { time = 0 node = "light_locator_02" particle = "ship_light_blue_effect" keep_particle = yes trigger_once = yes }
    }
    state = { name = "death" state_time = 5 }
}

entity = {
    name = "test_01_corvette_S1_entity"
    pdxmesh = "test_01_corvette_S1_mesh"

            ######### WEAPON LOCATORS #########
            locator = { name = "small_gun_01" position = { 0 0 0 } }
            ###################################

    default_state = "idle"
    state = { name = "idle" state_time = 5
        event = { time = 0 node = "engine_medium_01" particle = "test_01_1_45_exhaust_idle_particle" trigger_once = yes keep_particle = yes }
        event = { time = 0 node = "engine_small_01" particle = "test_01_0_65_exhaust_idle_particle" trigger_once = yes keep_particle = yes }
        event = { time = 0 node = "engine_small_02" particle = "test_01_0_65_exhaust_idle_particle" trigger_once = yes keep_particle = yes }
        event = { time = 0 node = "engine_small_03" particle = "test_01_0_65_exhaust_idle_particle" trigger_once = yes keep_particle = yes }
        event = { time = 0 node = "light_locator_01" particle = "ship_light_blue_effect" keep_particle = yes trigger_once = yes }
    }
```

Locators tell the game where the weapon models (i.e. turrets) will sit on the ship. While not strictly necessary, without locators all weapons will sit at the origin point, and this may or may not be acceptable.

This part of the process takes some time. You will need to edit the { 0 0 0 } section in the locator details to position the ship’s weapons along your model. I advise editing them all at once and jumping back into the game to see if they’re in the right spot. Eventually you can get the locators in the right spot with time.

——-

And that should be it. Creating a full shipset takes time, but it is rewarding to see your handiwork zooming across space. I encourage you to play around with the numbers to see how they work. I’m afraid I’m not the best at tutorials or explanations; and I learn best by fiddling with the workings of things and seeing how they break, and how to fix them, so my understanding of things is somewhat… fragmented.

Still, I would be happy to edit this tutorial to make it more concise and/or clear. I hope this can help anyone in some way, and most of all, I hope to see more shipsets mods floating out there!