HOW TO CREATE CUSTOM AERIAL SCENERY IN MSFS

by Augustin Winther

Version 1.1 | 2020-08-31

Table of Contents

0 – Introduction

This guide will show you how to create an aerial scenery in MSFS.

Please do note that is tutorial will not show you how to install the prerequisites. It is also pretty much necessary to already have some knowledge of scenery development in MSFS.

We will be creating an aerial scenery for the airport ENFL - Florø Airport

0.1 – Prerequisites:

[Ortho4XP by Oscar Pilote](#) *- Version as of writing is v130*

[QGIS (Standalone Installer)](#)*- Version as of writing is 3.14*

[tiles2bing by Christine Winther](#)*- Version as of writing is 0.0.2*

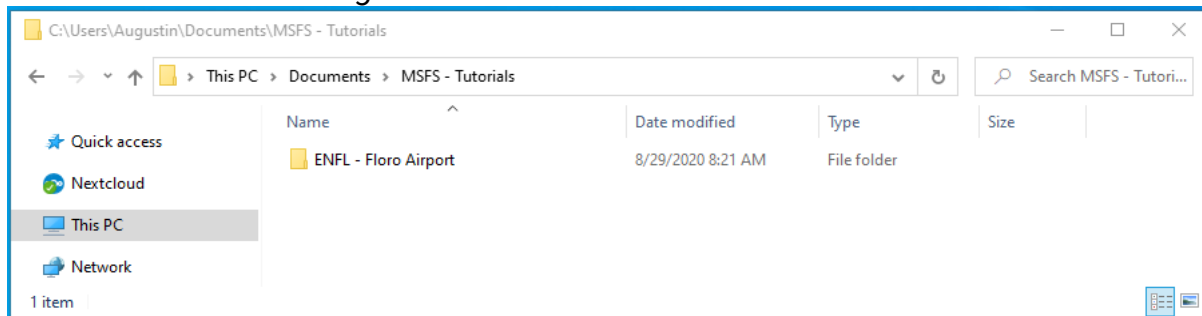MSFS SDK *- Version as of writing is 0.5.1*

1 – Setting up our project

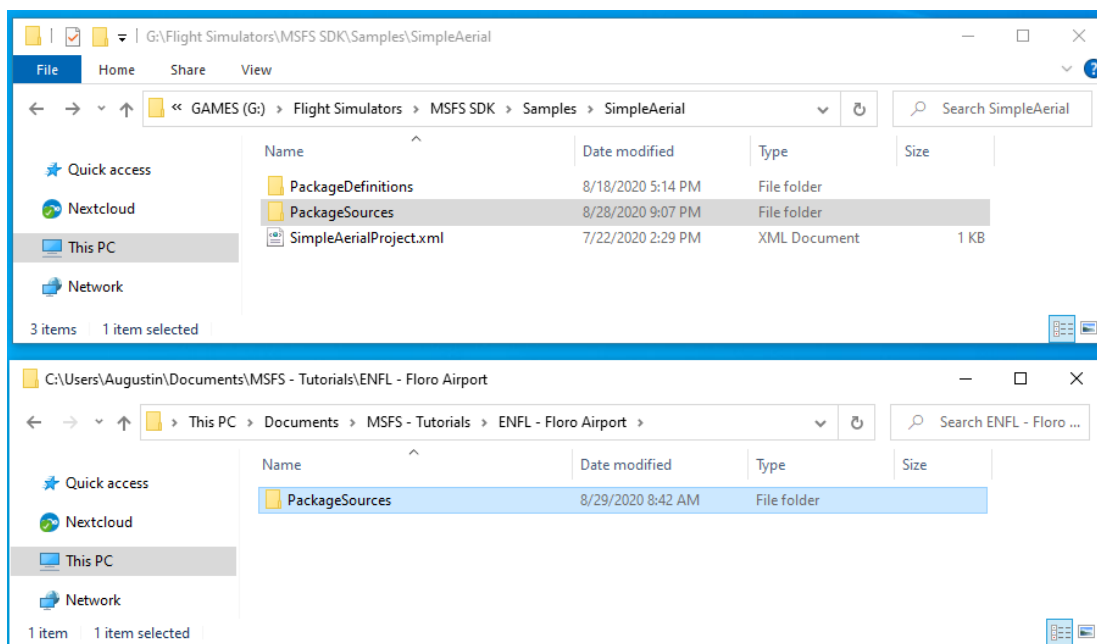Create a project folder if you don't already have one.

It doesn't matter where you place it, as long as the drive you are using has enough space.

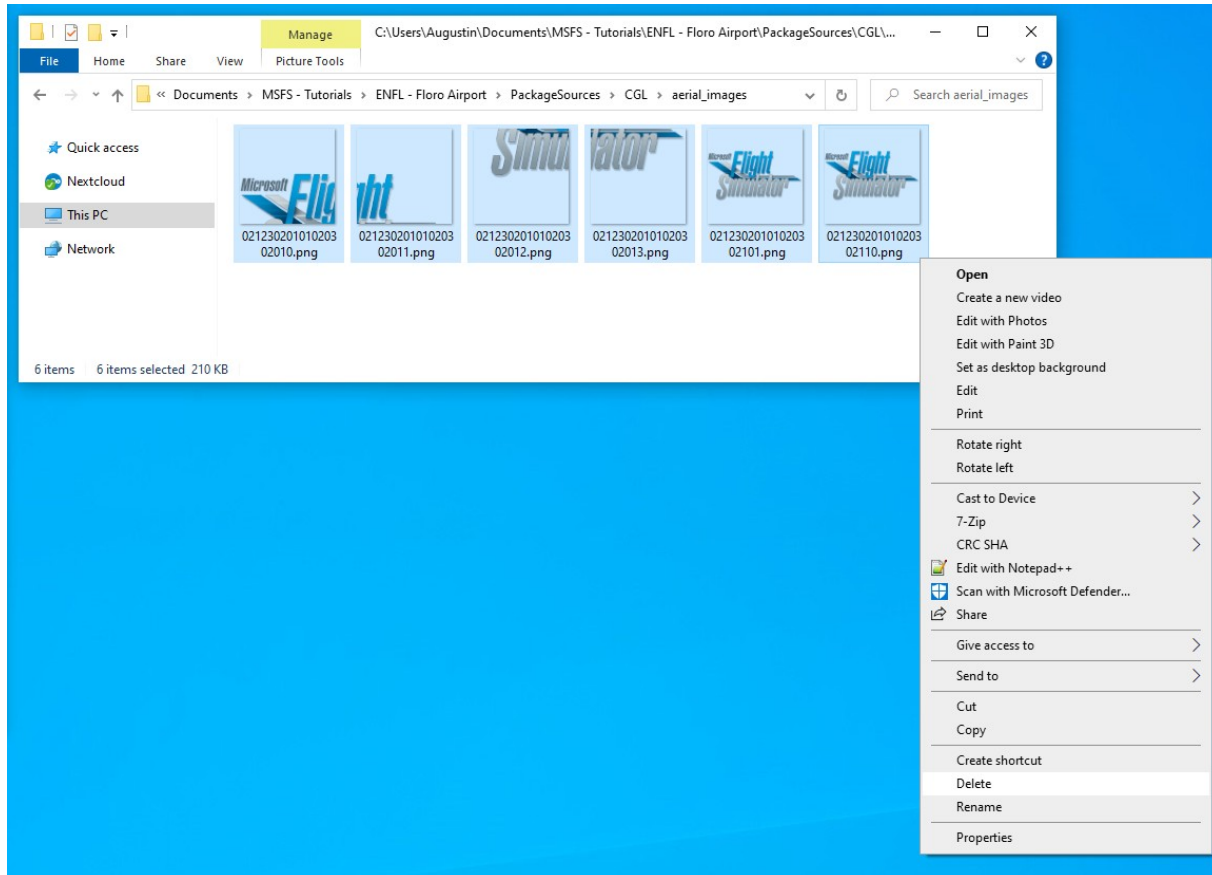I recommend naming the folder with the airport name.
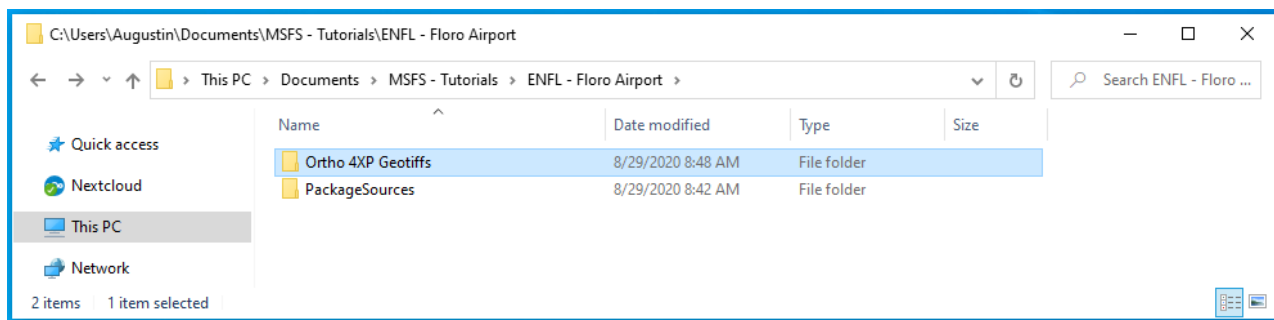
NOTE: Do not use non-English letters in the name

Copy and paste the `PackageSources` folder from `MSFS_SDK_LOCATION\Samples\SimpleAerial` to your project folder

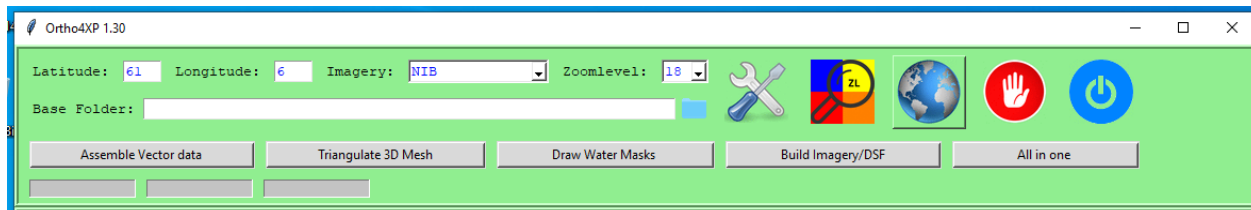Delete the sample aerial images inside `YOUR_PROJECT_FOLDER\PackageSources\CGL\ aerial_images`

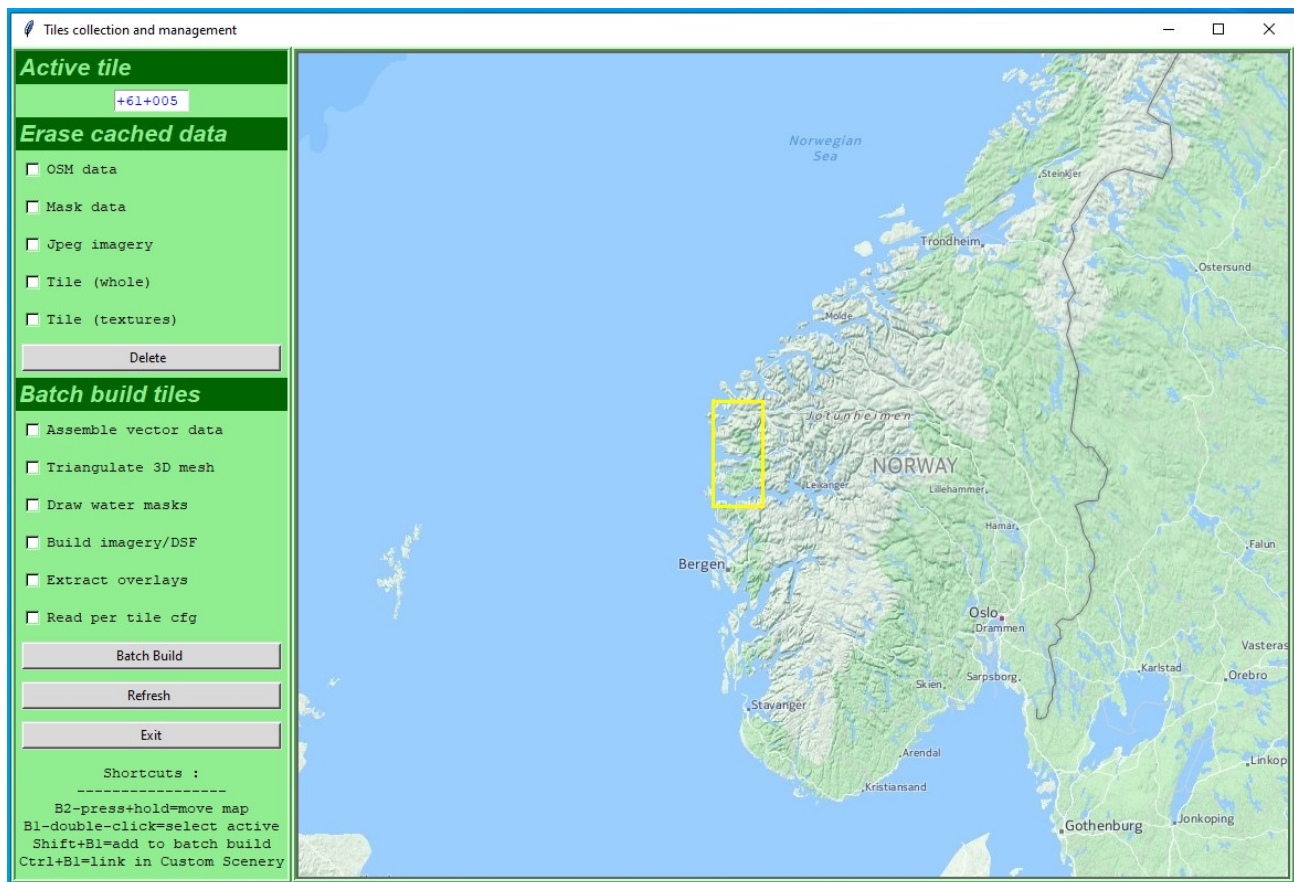Create a folder for the `.tif` files we will be downloading via Ortho4XP

2 – Downloading our aerial imagery
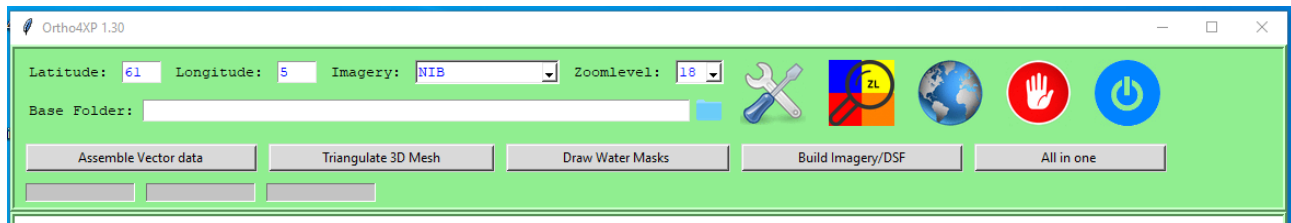
Open up Ortho4XP, and click on the world icon

Find the tile that you airport resides in.

Double click the left mouse button on the map to select a tile. The tile will receive a yellow border when selected. Once selected, exit out of the map window
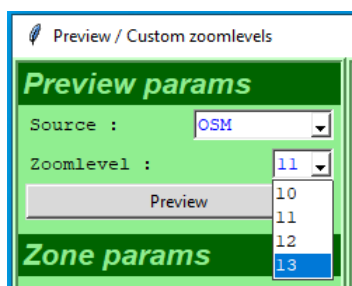
Back in the main menu of Ortho4XP, click the multicolored ZL icon

In the ZL windows, select a *Preview source.* This will be the background image in the ZL window, so that we have a reference on where we are selecting tile*s..*
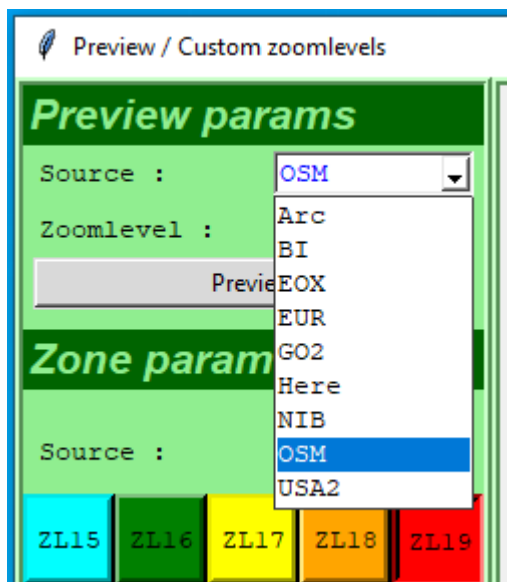

Select Zoom level 13. The closer in we see the preview, the better precision we have with selecting tiles we want to download. After this, click preview

Now you will see an aerial image of the tile we select in the preview window, to move around, hold down the right mouse button and drag. Time to find the airport.
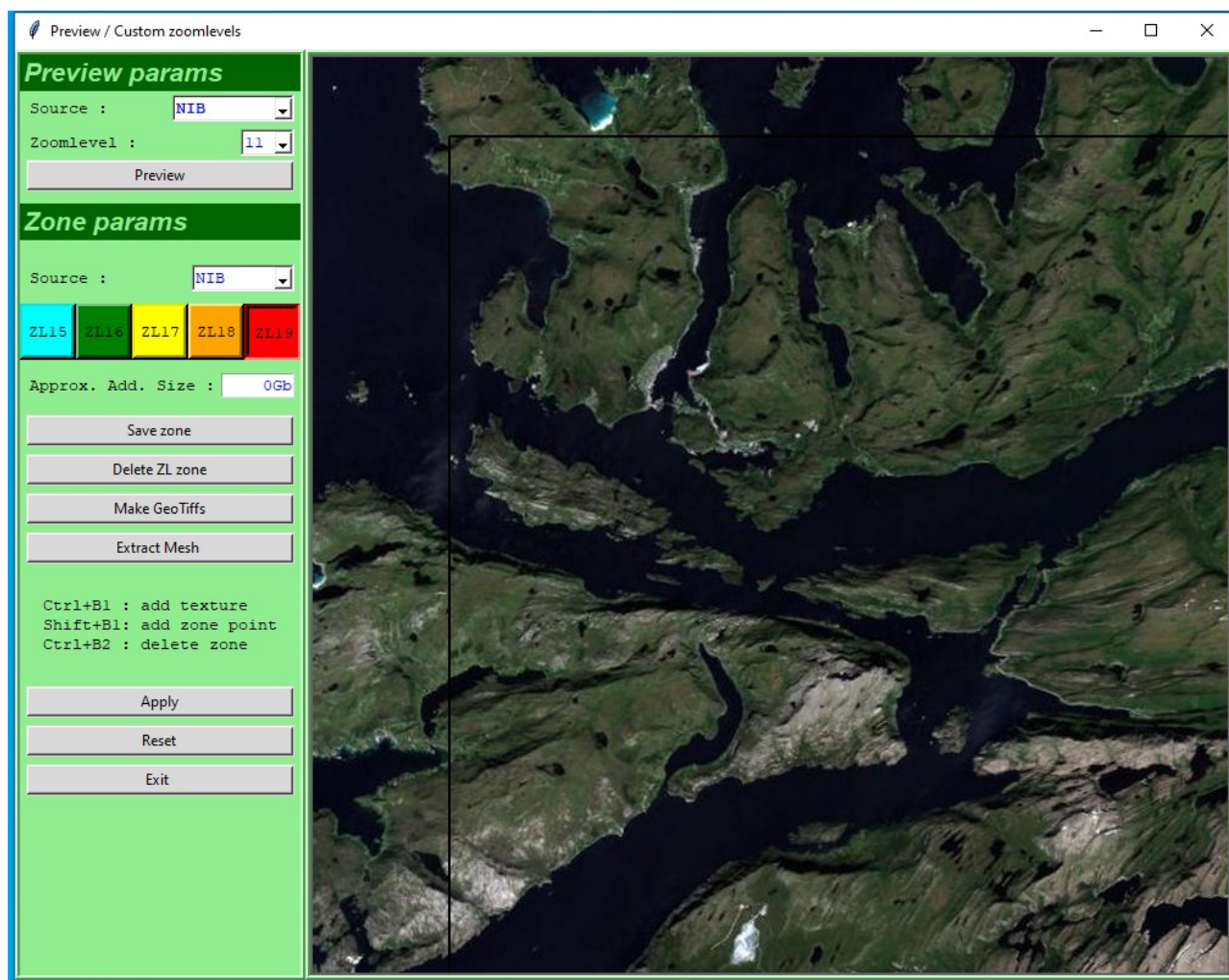
After some searching, I found my airport! As you can see it's quite small on the preview window *(since I forgot to select zoom level 13)*.This is why having the Preview Zoom Level to 13 is important!
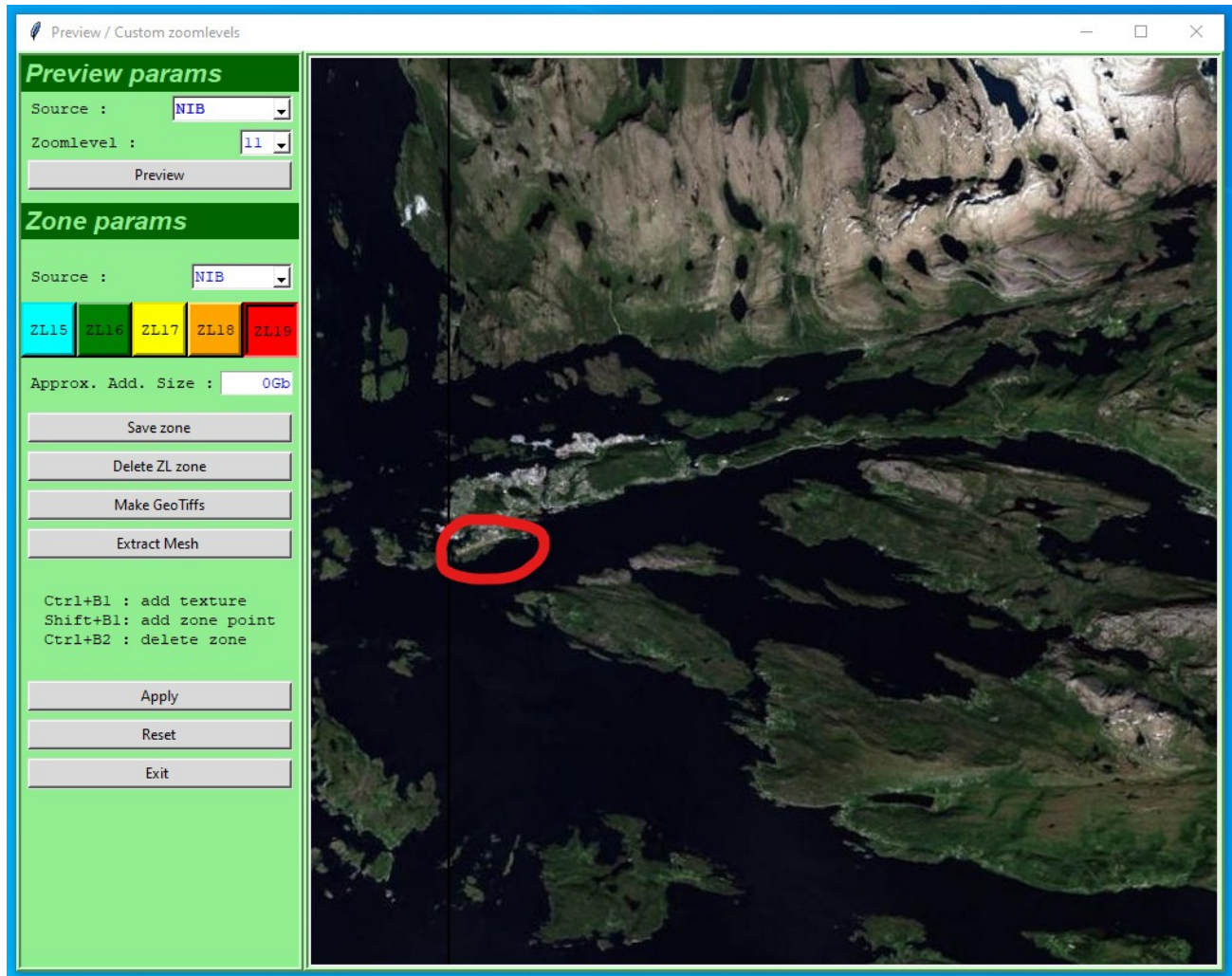
Now it's time to select which source we want to download from, and what ZL *(Zoom Level, higher number, more crisper image and more disk space)* we want.

Use the source that has the best quality aerial imagery on your project location, and select a Zoom Level. I'm going to use ZL19 to get the best possible aerial image.
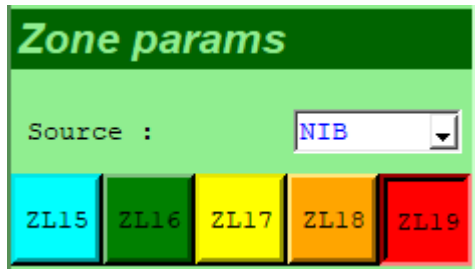
To select the tiles you want to download, Hold down CTRL and click the left mouse button. To delete a tile, hold down CTRL and press the right mouse button. Once you have selected your tiles, click on `"Save zone"`, and `"Apply"`. Finally click on `"Make GeoTiffs"`. *Note down how many tiles you have by height and width. In my case I have 3 tiles high, and 5 tiles width.*
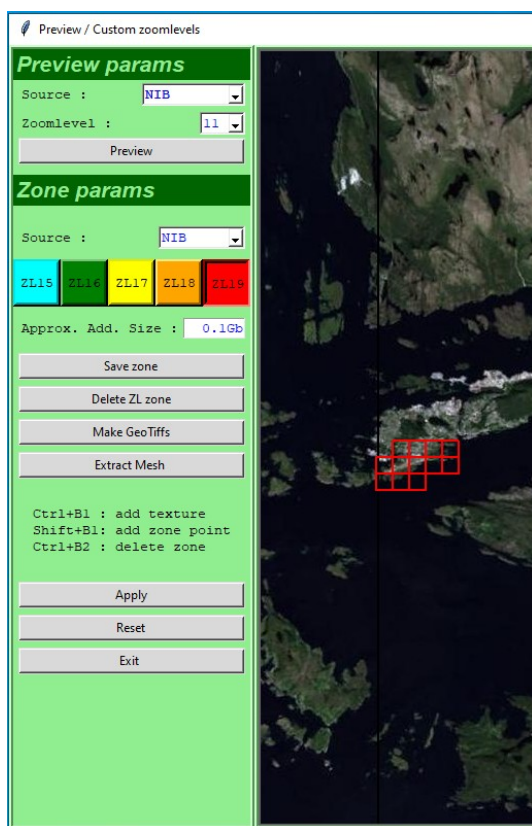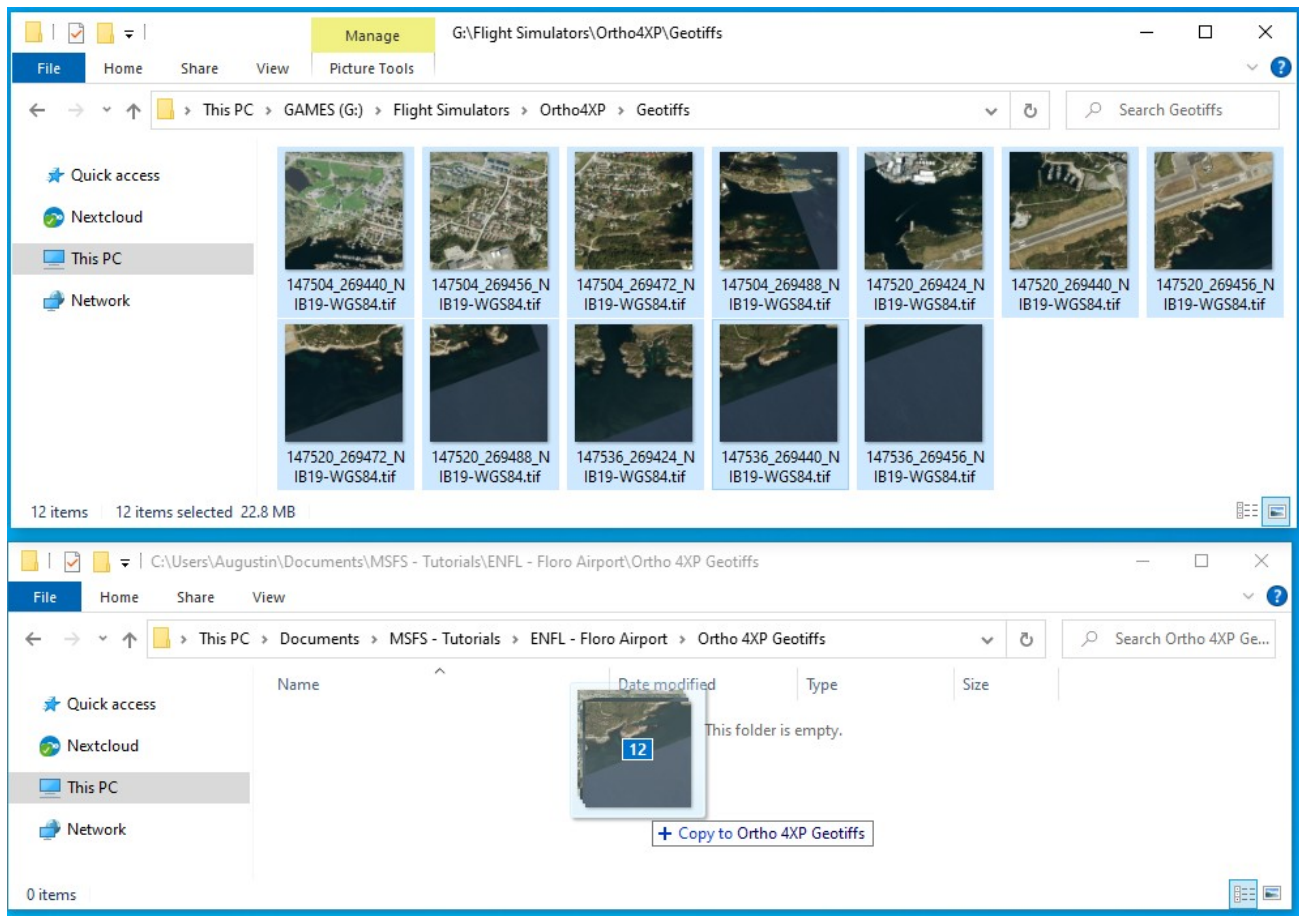
You will then see in the main menu on Ortho4XP that the log is showing the downloading and converting of the aerial images
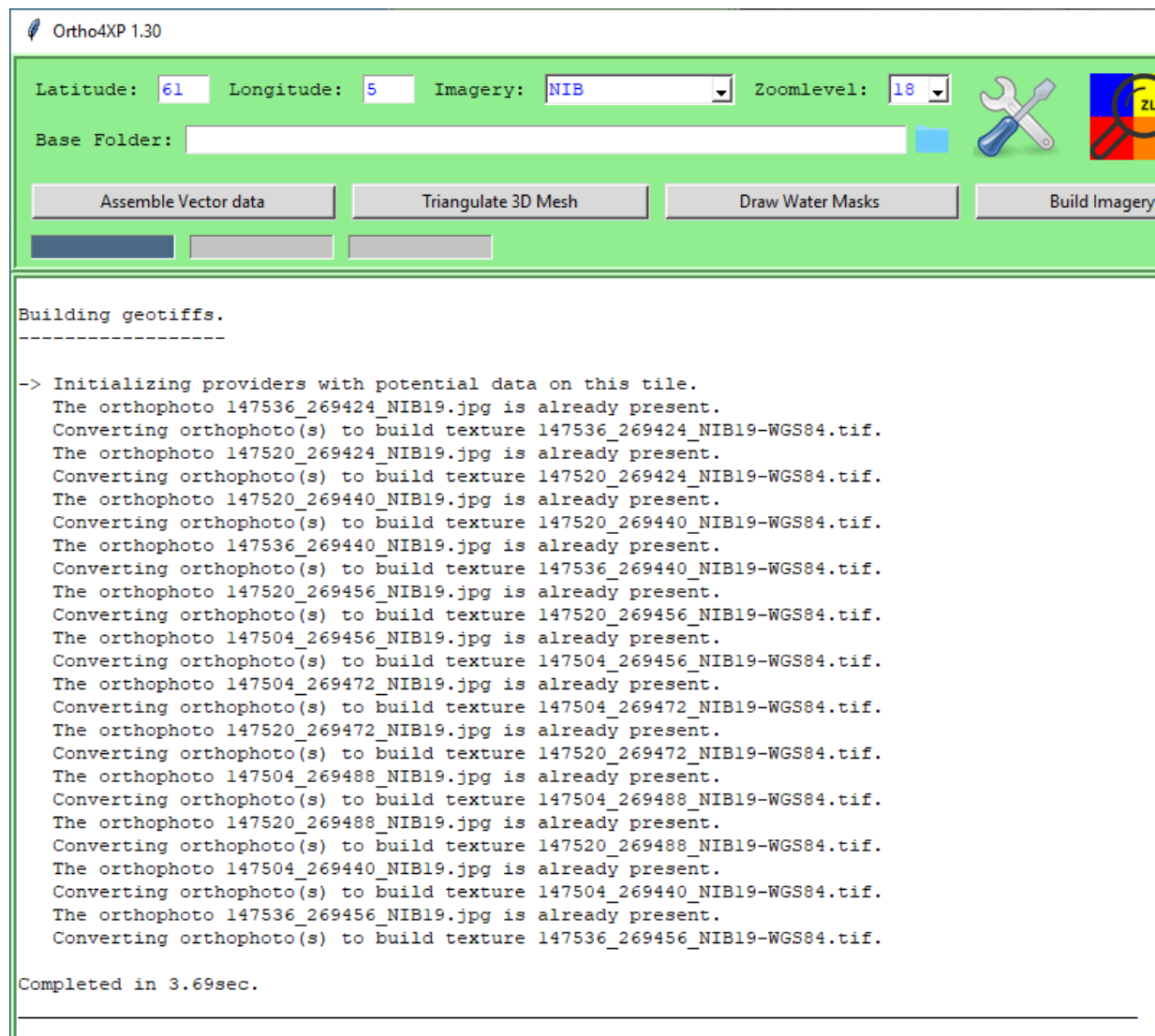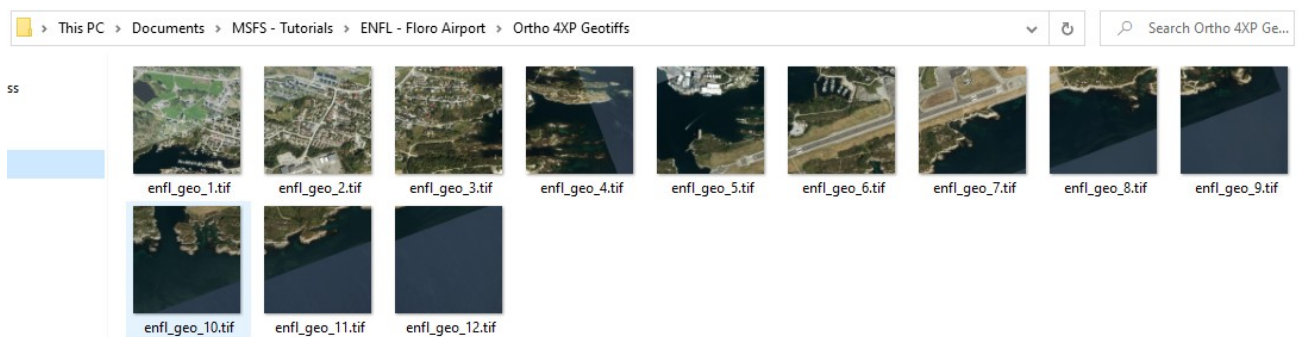

You can now exit out of Ortho4XP

Copy the downloaded `.tif` files from `ORTHO4XP_LOCATION\Geotiffs` to your project folders `.tif` file folder we created earlier
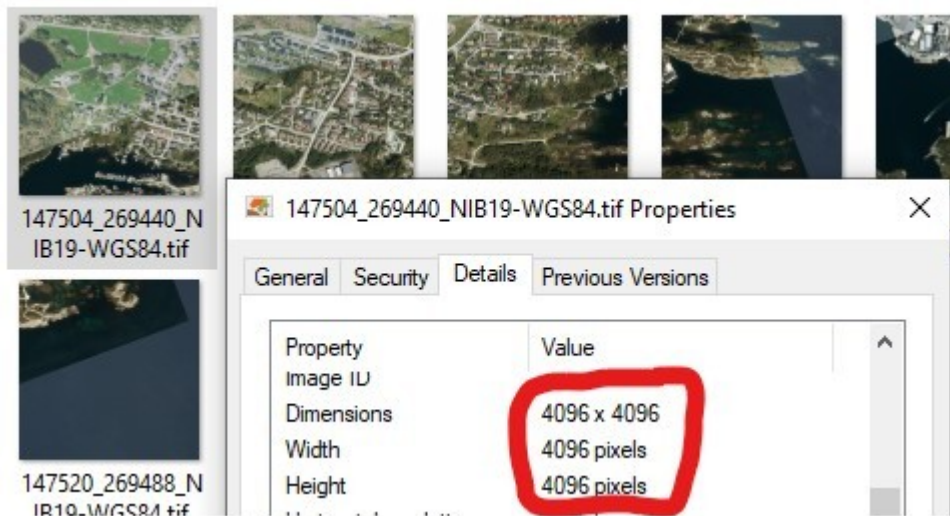


I would also recommend to rename them for simplicity sake

3 – Editing our aerial imagery

I'll start of by finding out what size my `.tif` files are. And I see that they are *4096x4096 px* *(Right click* `.tif` *file and select properties)*.
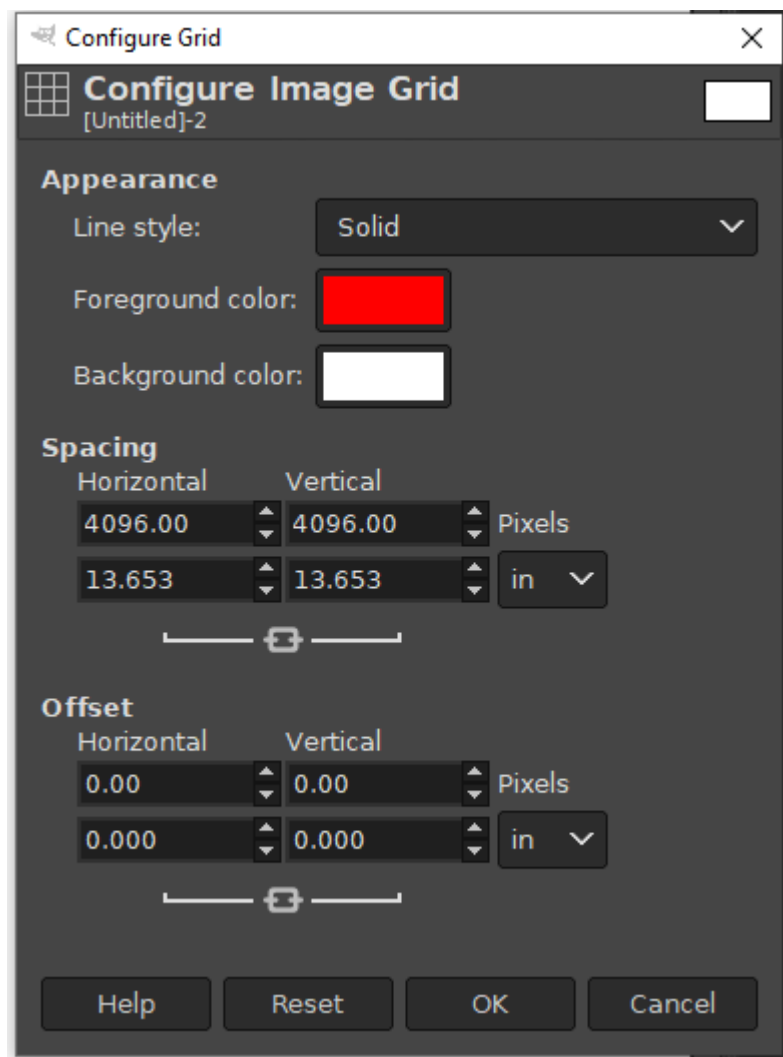

So I start up my preferred image editing software, [GIMP](#). And I start a new image with *4096px*3* for the height, and *4096px*5* for the width. 3 and 5 are the numbered we noted down when we selected tiles in the ZL window in Ortho4XP
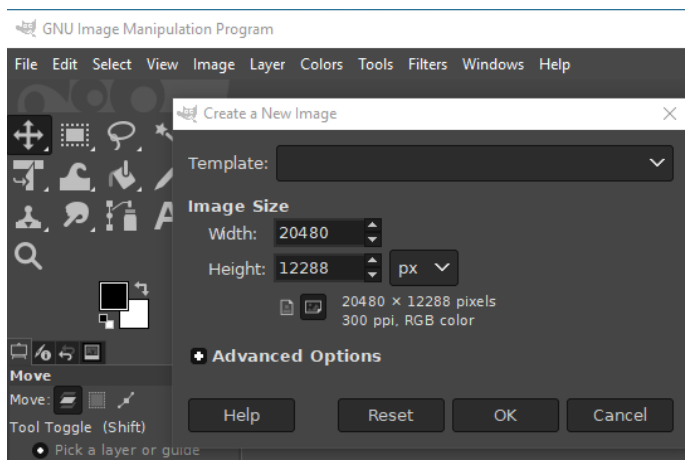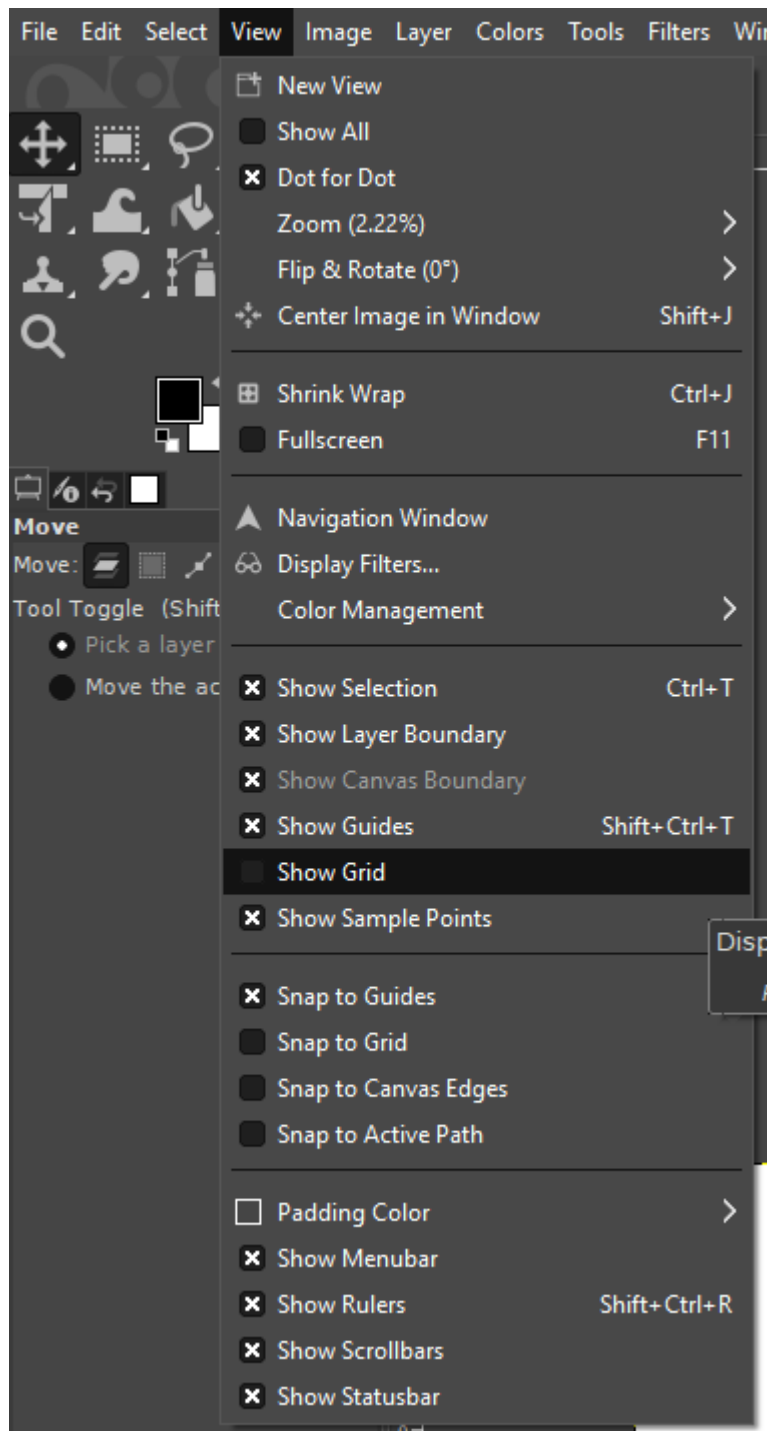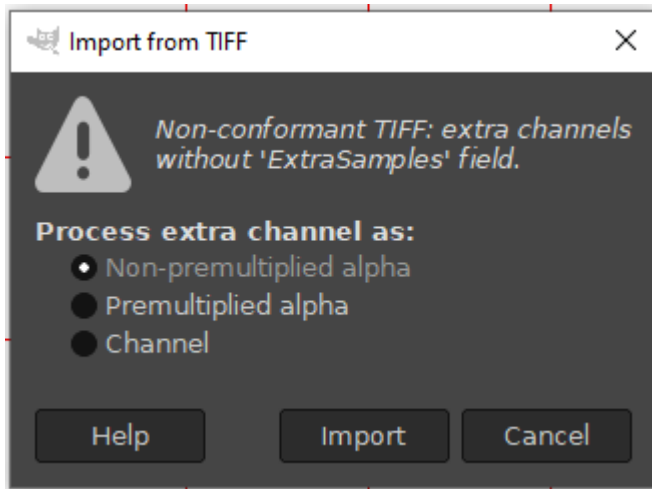
Now we need to configure the grid of our project
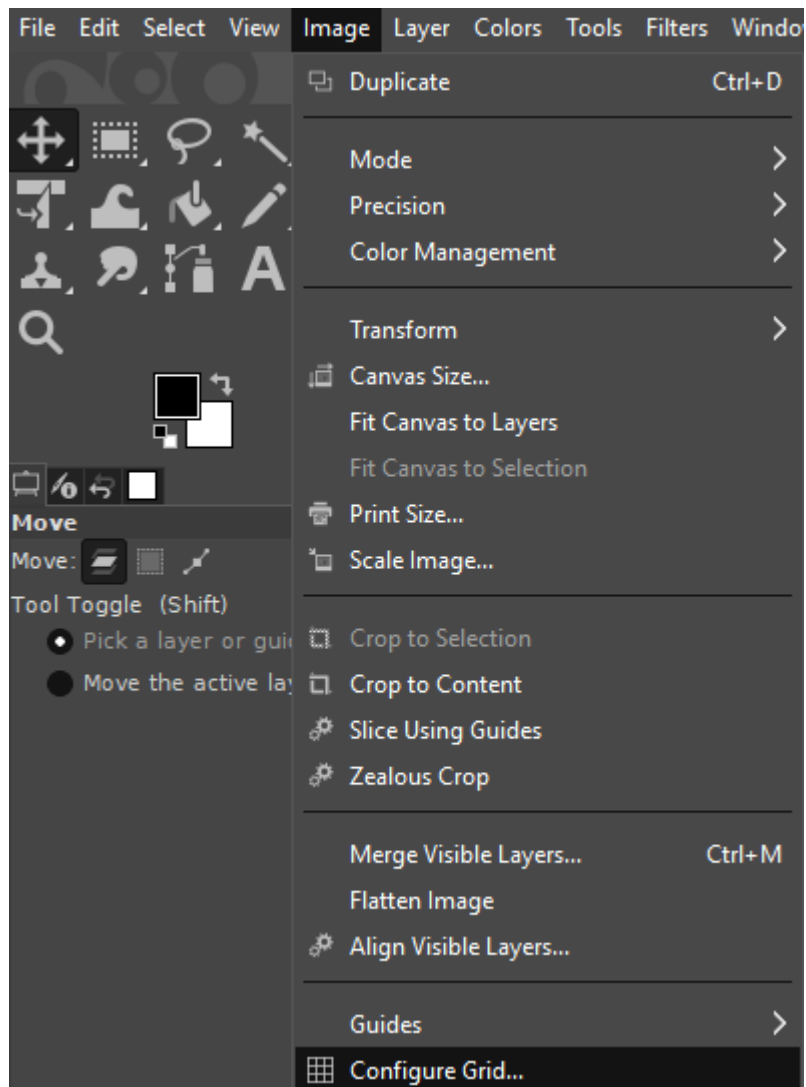
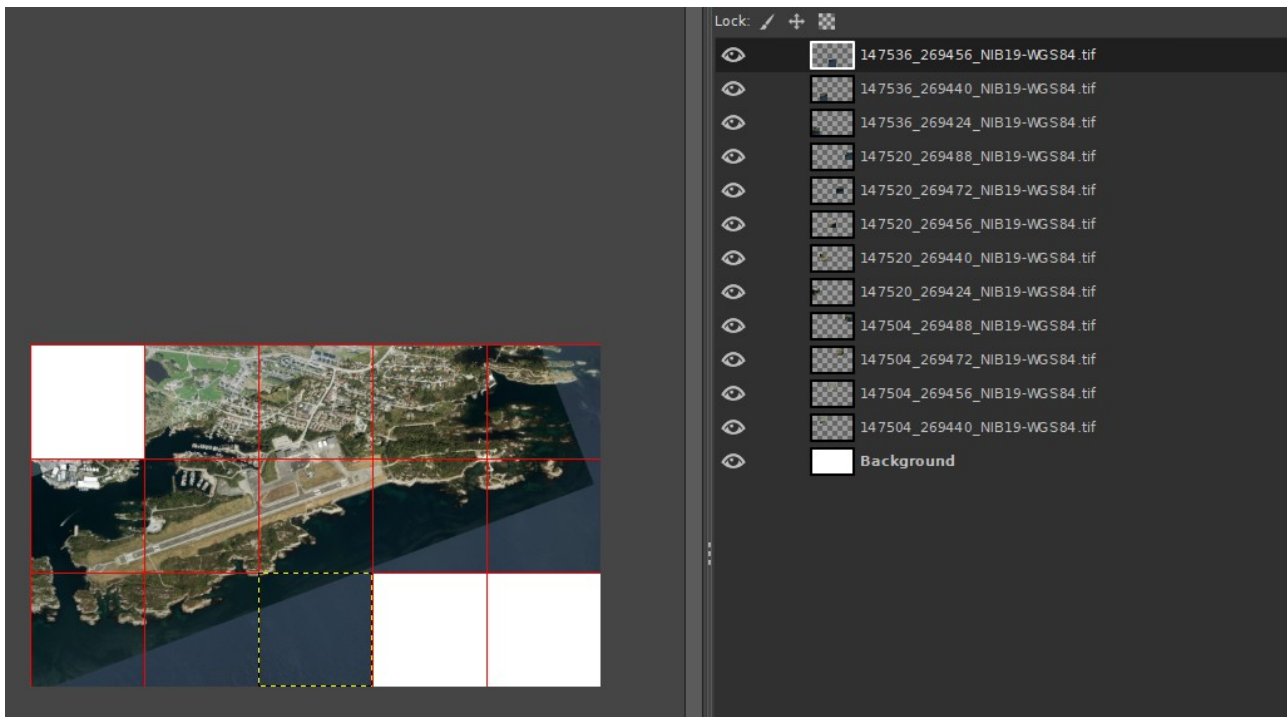Set the grid to 4096x4096 since that is the size of the `.tif`'s

Then enable **"Show Grid"** and **"Snap Grid"**

Drag and drop the `.tif` file into Gimp. This pop-up window will show. Press **"Import"**
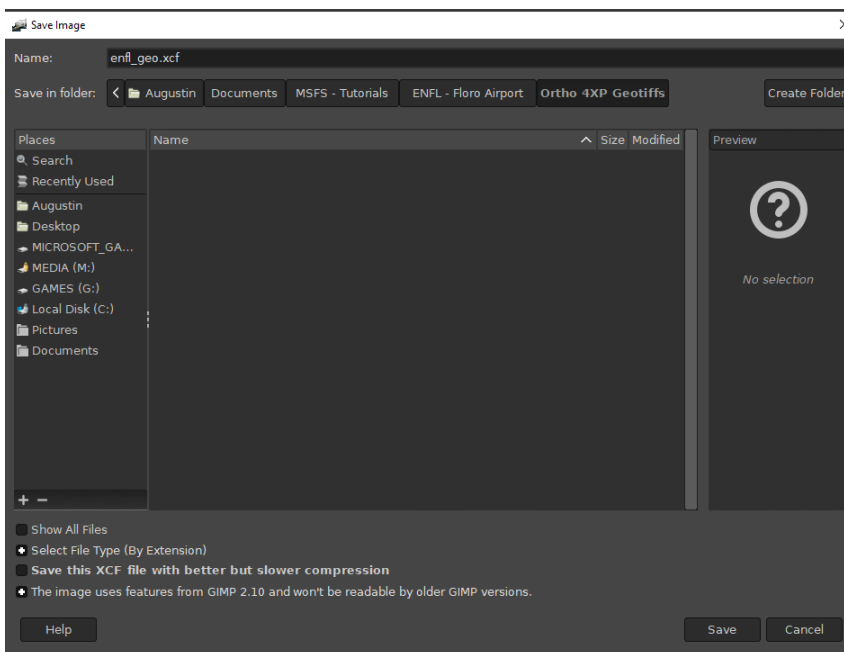

Make sure to align them correctly with the grid.

To remove unwanted aerial photo, just erase it with the eraser



Remember to SAVE during your editing!

I will not cover color correcting since I do not have enough experience with that

Once you happy with you edit, it's time to export it as a `.png`.

REMEMBER to disable the white background in GIMP. You want the background of the image to be checkerboard, meaning it is transparent.
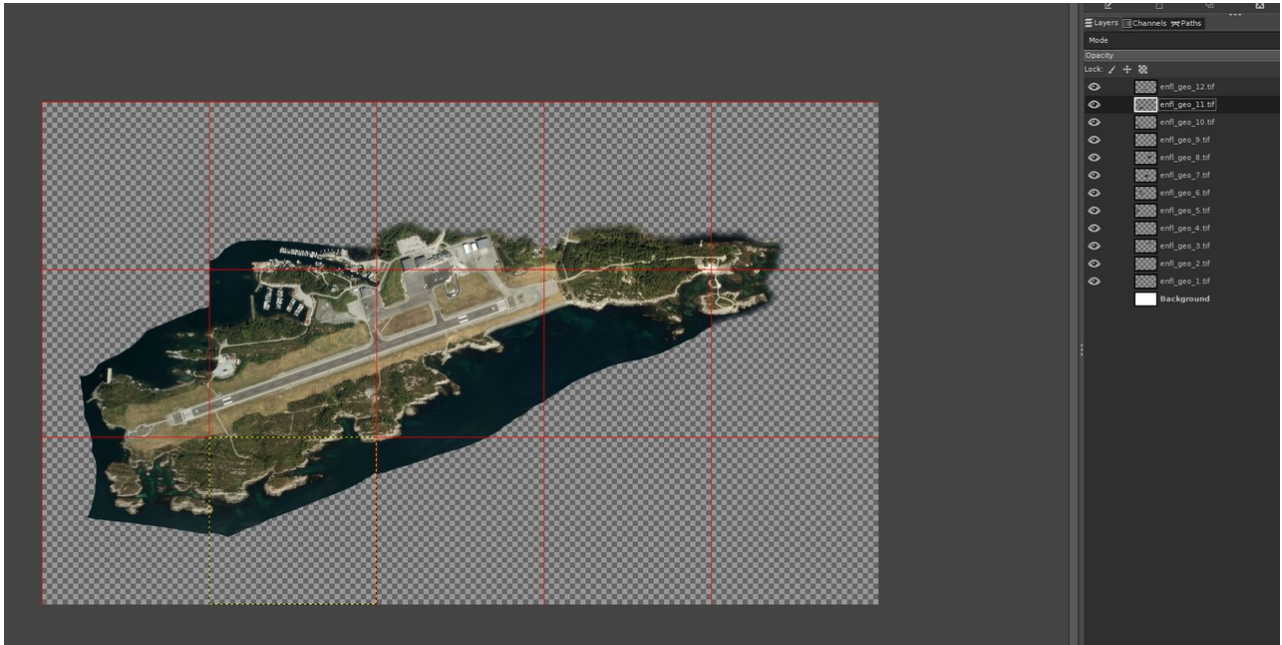
Go to `File > Export As`, and export it as `.png` *(end the Name: with a ".png")*. Click **"Export"**, and when another windows pops up, click **"Export"** again. Note, that it may take a few minutes, it's a lot of data. I'll save mine as `enfl_geo.png`
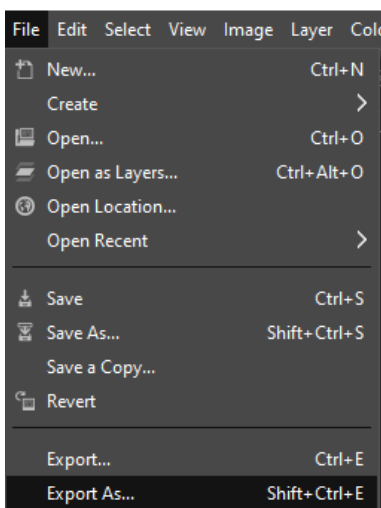
4 – Importing, georeferencing and exporting in QGIS

Open up QGIS, and right click on **"XYZ Tiles"**, and click on **"New Conecction"** *(If you don't see the "Browser" panel. Go to* View > Panels > Browser *and check the box)*
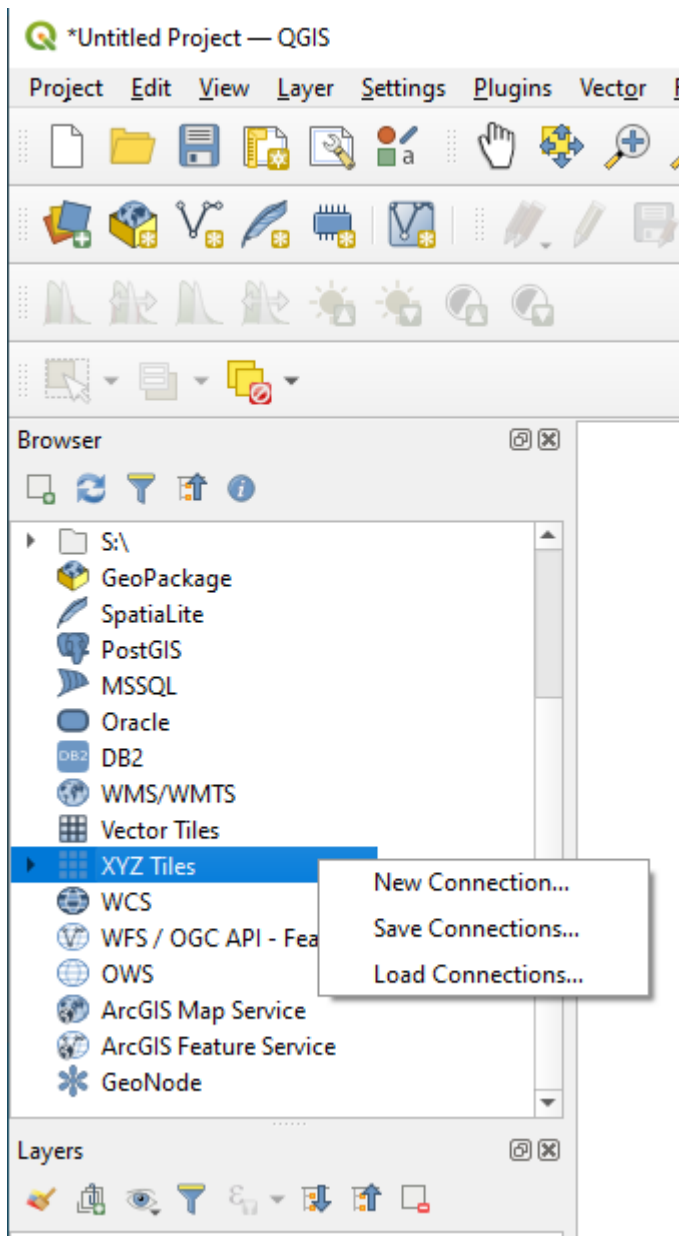
Select the reference map to use in QGIS *(This will be the map we use to know where in the world we are)*

I'll be using Bing, but you can use any of the ones listed below. Copy the link and paste it into the URL field in the `XYZ Connection` window, and give it a suitable name.

OpenStreetMap: http://tile.openstreetmap.org/{z}/{x}/{y}.png
Bing Aerial: http://ecn.t3.tiles.virtualearth.net/tiles/a{q}.jpeg?g=1
Google Hybrid: https://mt1.google.com/vt/lyrs=y&x={x}&y={y}&z={z}
Google Satellite: https://mt1.google.com/vt/lyrs=s&x={x}&y={y}&z={z}
Google Road: https://mt1.google.com/vt/lyrs=m&x={x}&y={y}&z={z}

Now, open up the XYZ Tiles tab, and right click the map you added in the last step and click on "Add Layer to Project"
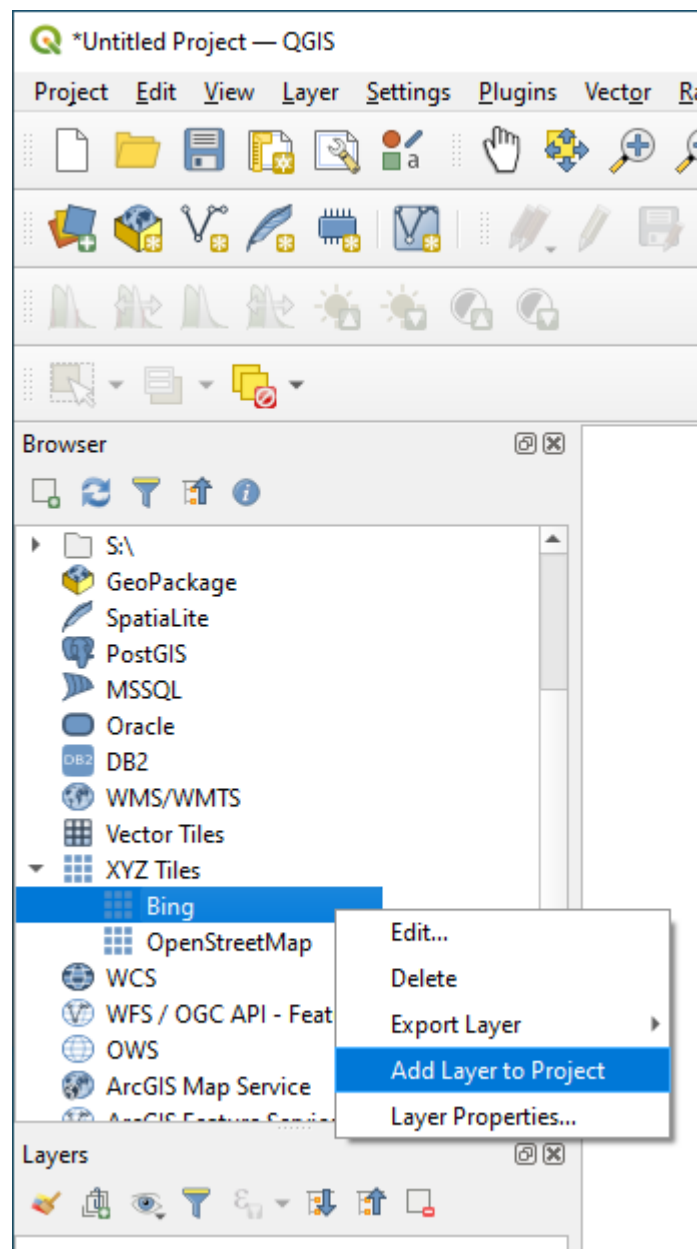
You should now see the map you chose in the preview window. Now you need to find the place you are creating an aerial scenery for
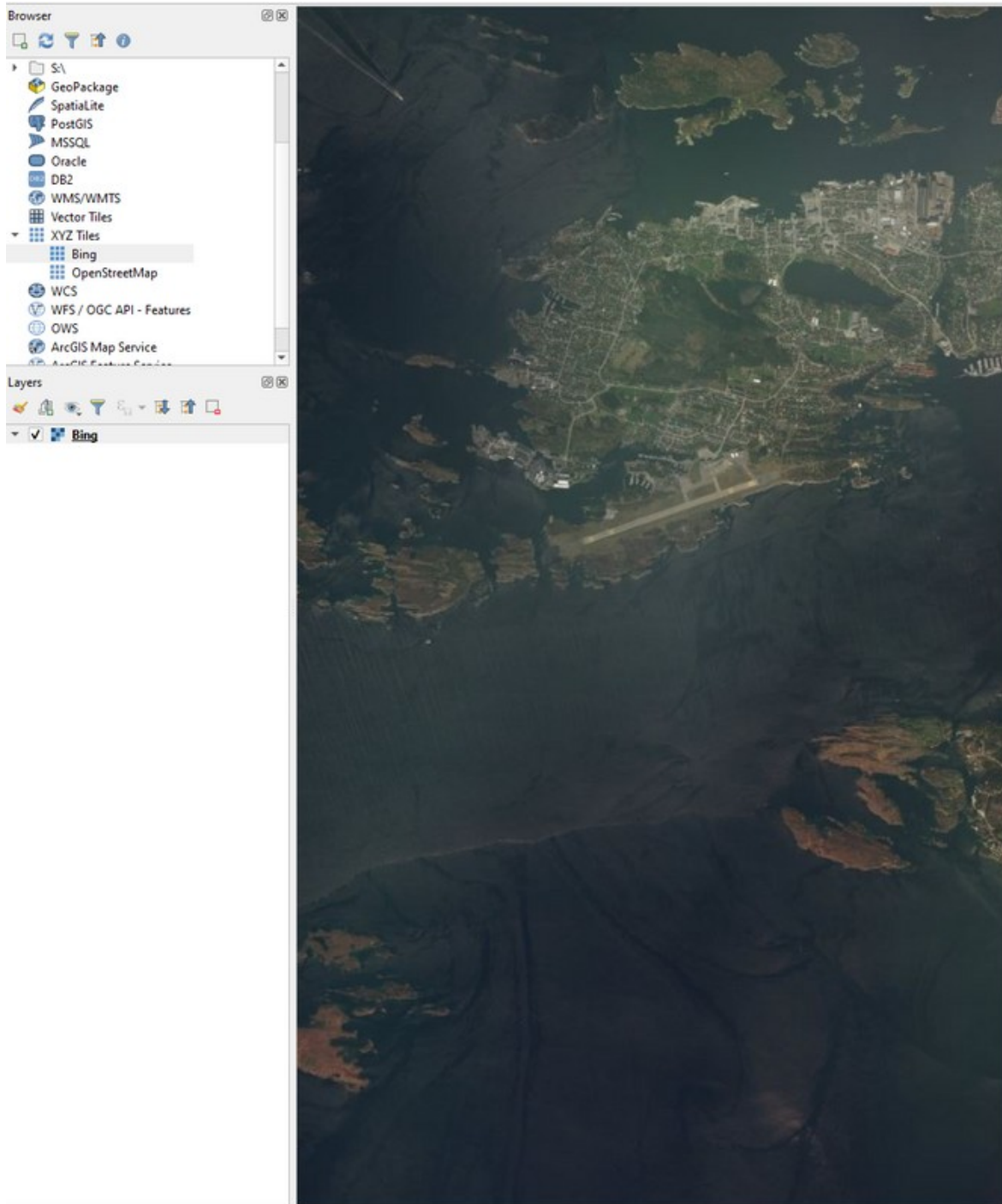
Now we need to georeference the aerial image. Basically meaning we need to give it information on where it's coordinates in the world is.
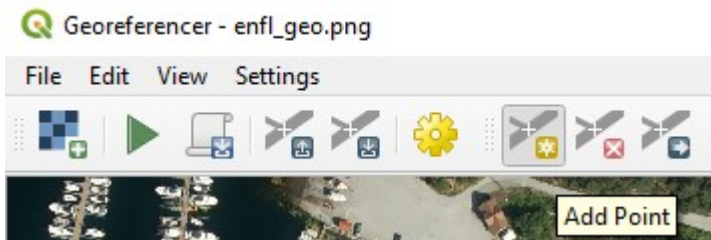
Go to `Raster > Georeferencer`
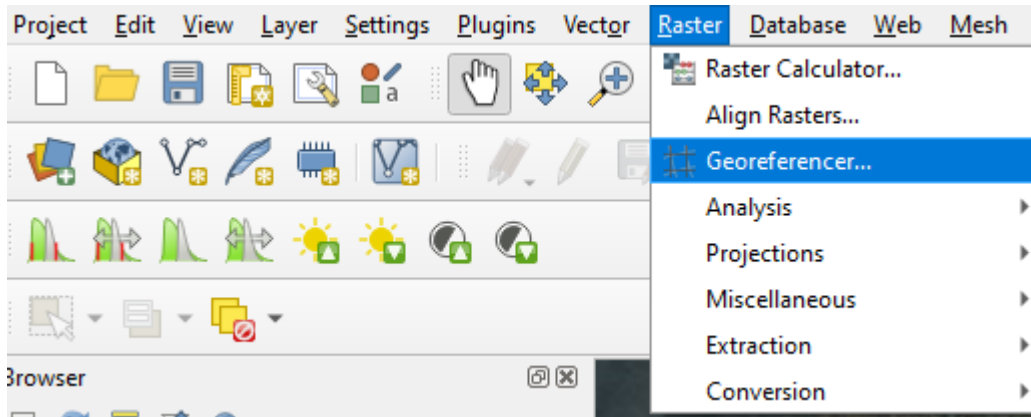
Click on `Open Raster` (*Blue and black checker-boarded icon)* and select your final exported `.png`. It may take a while for it to load
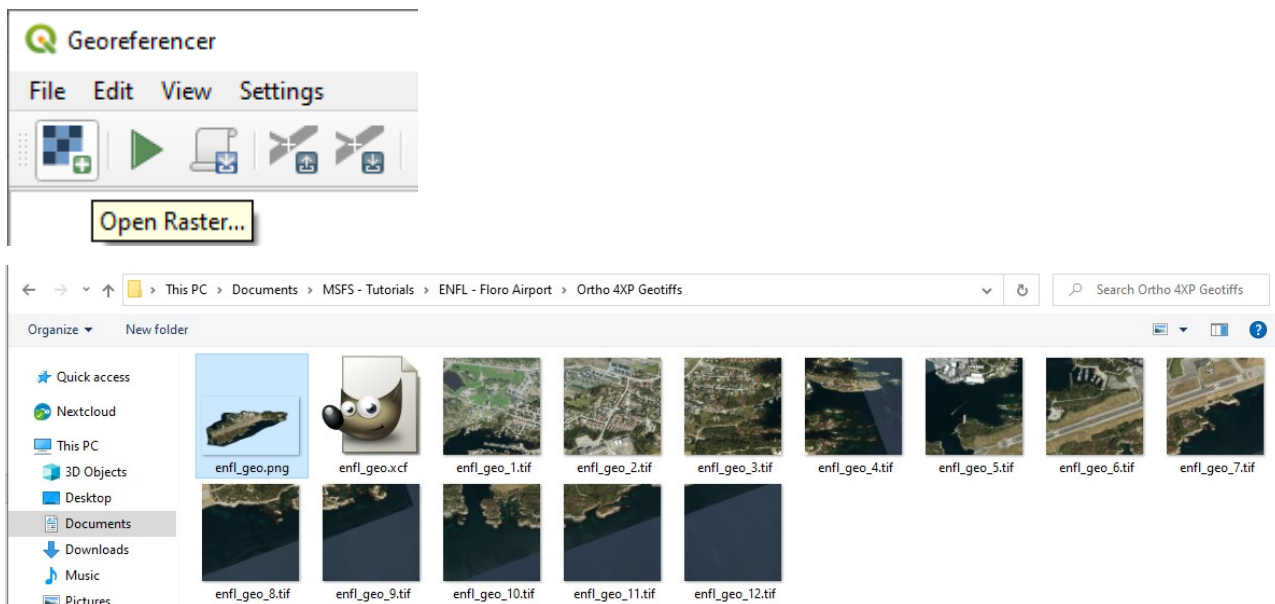
When it's loaded click on the `"Add Point"` button. You will now see that the cursor turns into a gray cross when you hover over the image.

Now, you need to find a reference point. A point that is easy to see on both the reference map you added, and your aerial imagery, and that is easy to be precise with, I will choose one of the corners of the touchdown markings on the runway.

Left click on the point and a window will pop up. Click on `"From Map Canvas"` and basically left click on the same point on the map canvas, and click "OK".
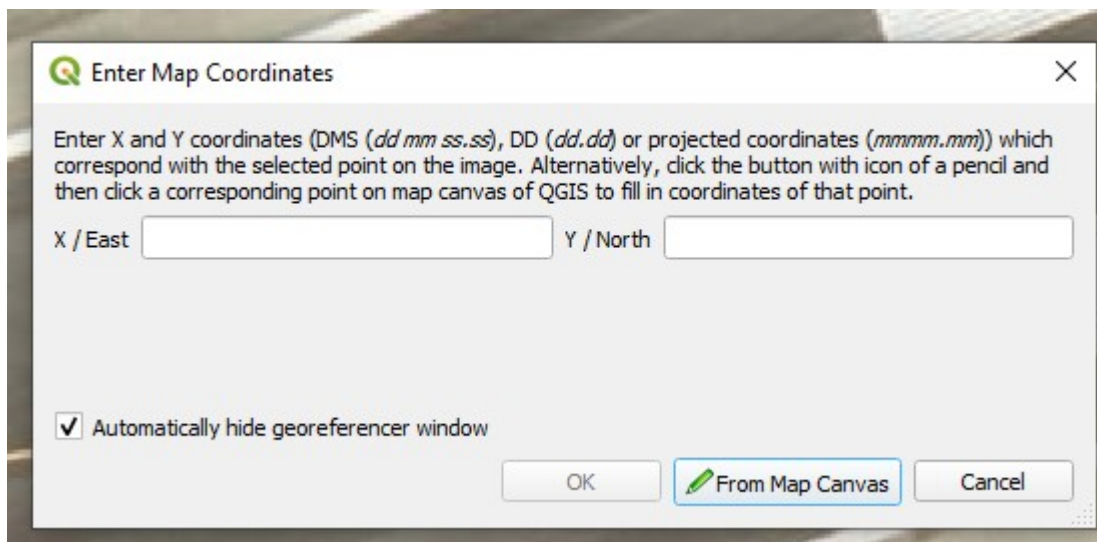
You have now created your first georeference point. I recommend that you create quite a few of these to increase the accuracy. I'll be creating 20. You can remove points by selecting the icon to the right to the `Add Point` icon

When you are done creating your points, click on `"Start Georefrencing"` *(Green play button)*

A little window will most likely pop up asking you to set the information type, click **"OK"**
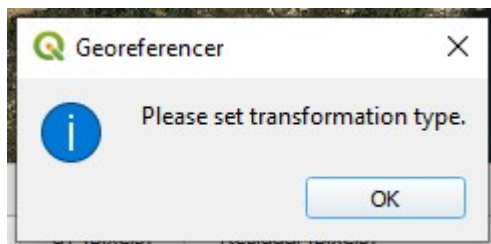
Another window will pop up, check that the settings in the picture below match yours. If not, change the settings accordingly. The output raster file name is up to you however. I will save it in the same folder with all the other `.tif` files as `enfl_geo_mod.tif`
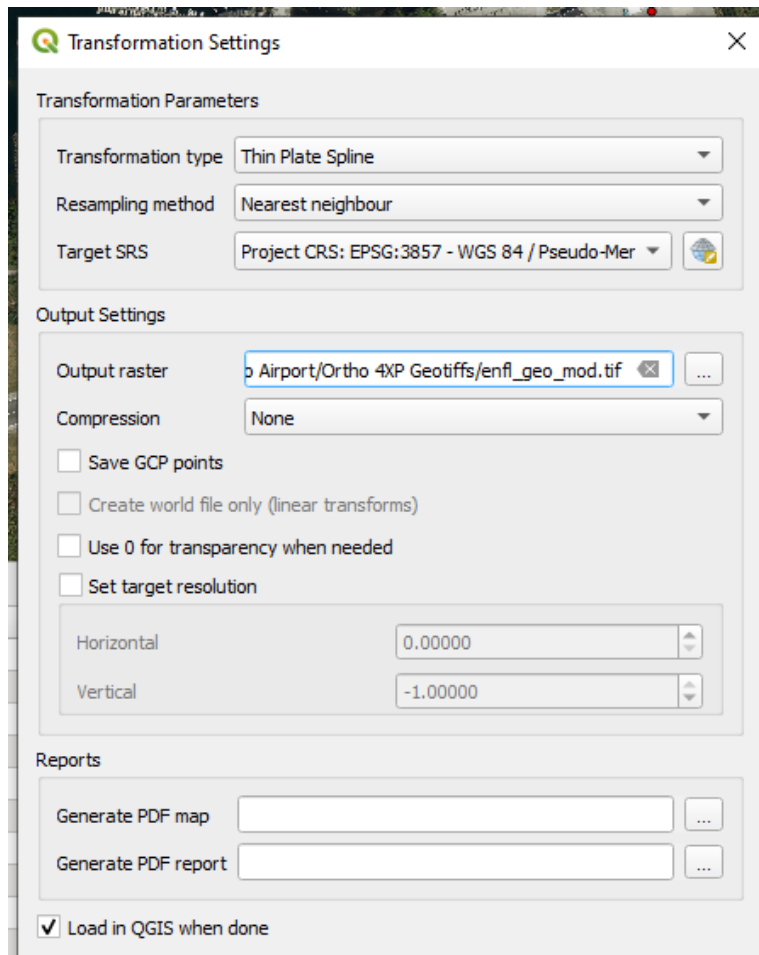
Click **"Ok"**, and click on **"Start Georeferencing"** (Green play button) again.

It will now start to georeference the image!
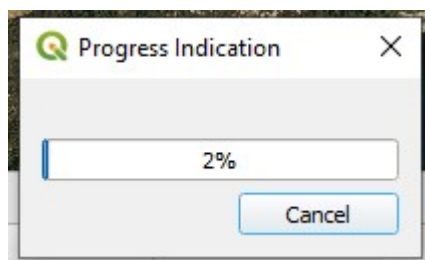
And tada! The image now has a geographical location!

If the image is not placed correctly on the map, then you need to georeference again, and try to add reference points on other places

Now it's time to export it!

Hide the other layers first by un-checking them so that out newly georeferenced layer is the only one showing
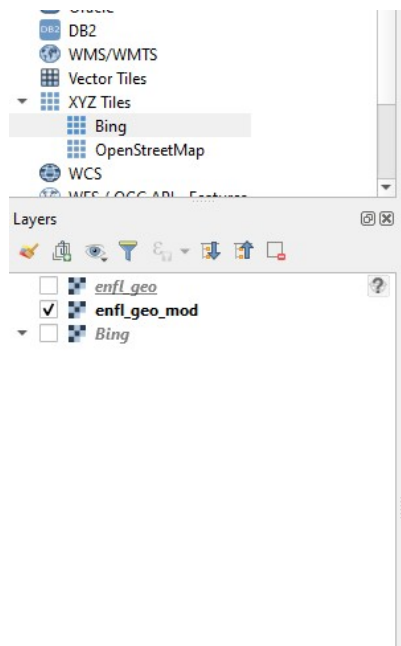
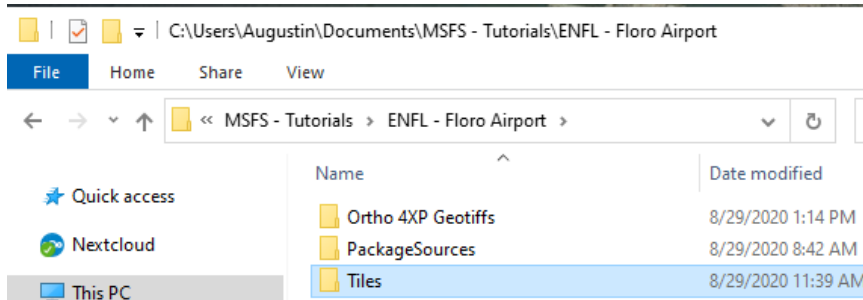Then we need to open up the Proccesing Tollbox. `View > Panels > Proccesing Toolbox`
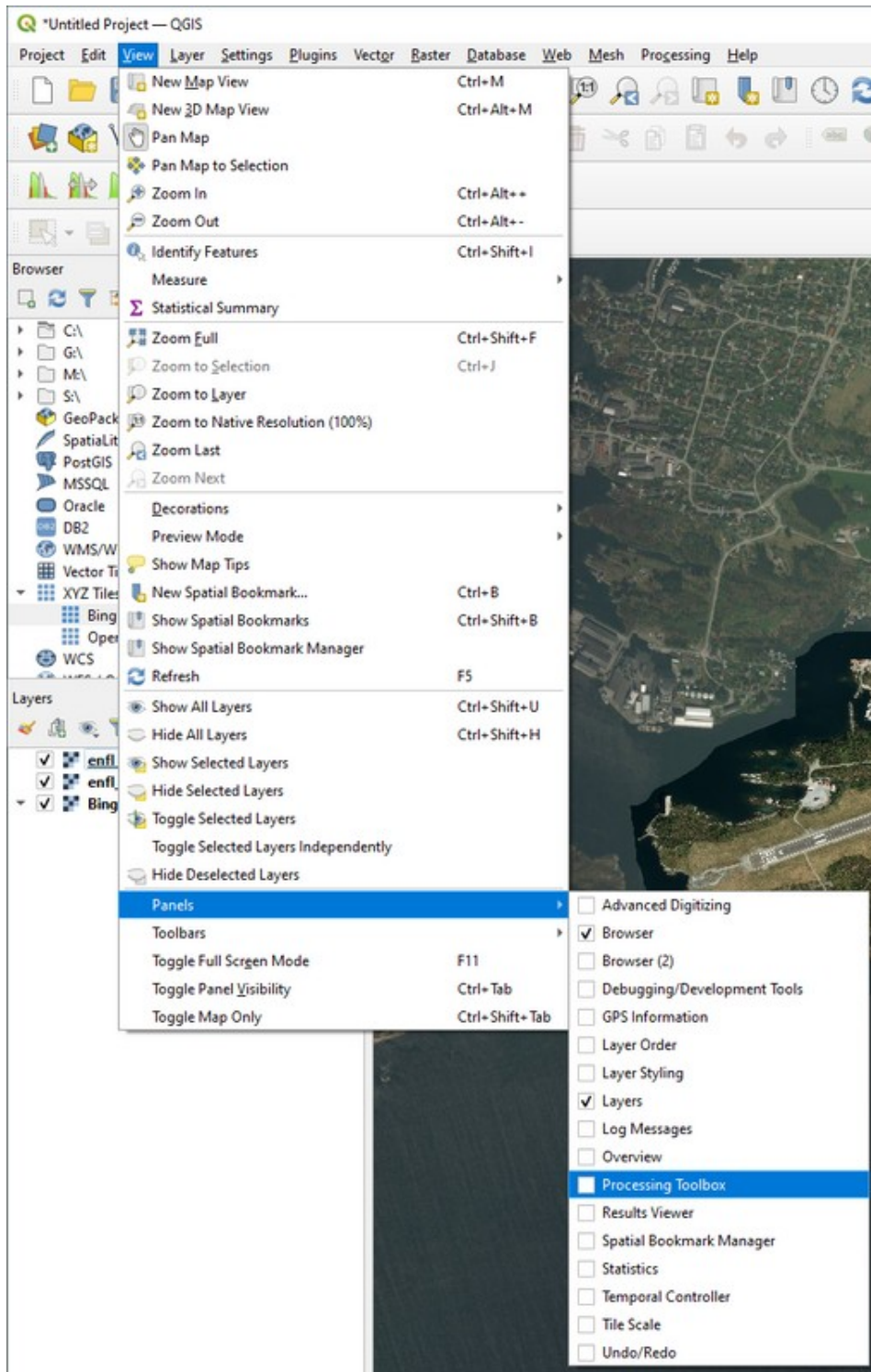
A new windows should appear. On it go to `Raster tools > Genereate XYZ tiles (Directory)`
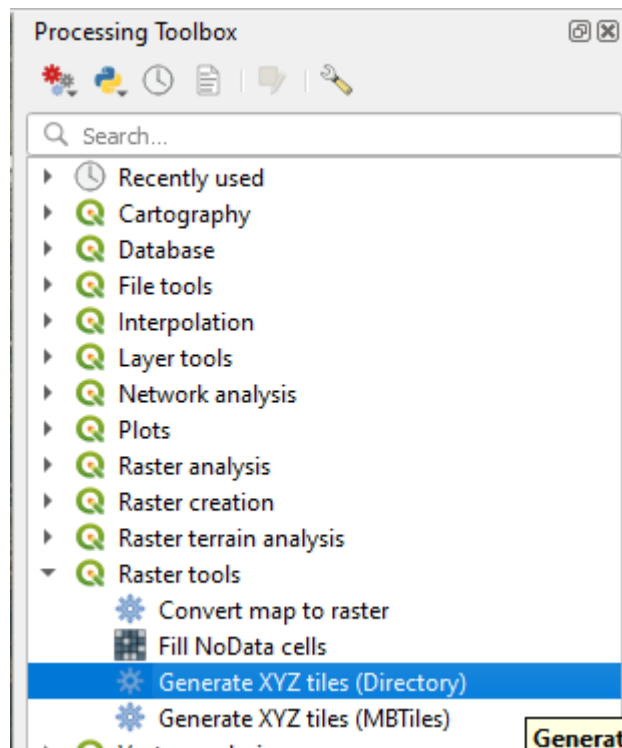
Choose the newly georeferenced layer as `Extent`

Set the `Minimum` and `Maximum` zoom to 19. And the output folder can be a folder in your Project folder called Tiles. So create that

Make sure your settings are correct and click **"Run"** to start the export. This will basically chop up the picture in to tiny squares which will we later convert to a structure that MSFS will understand
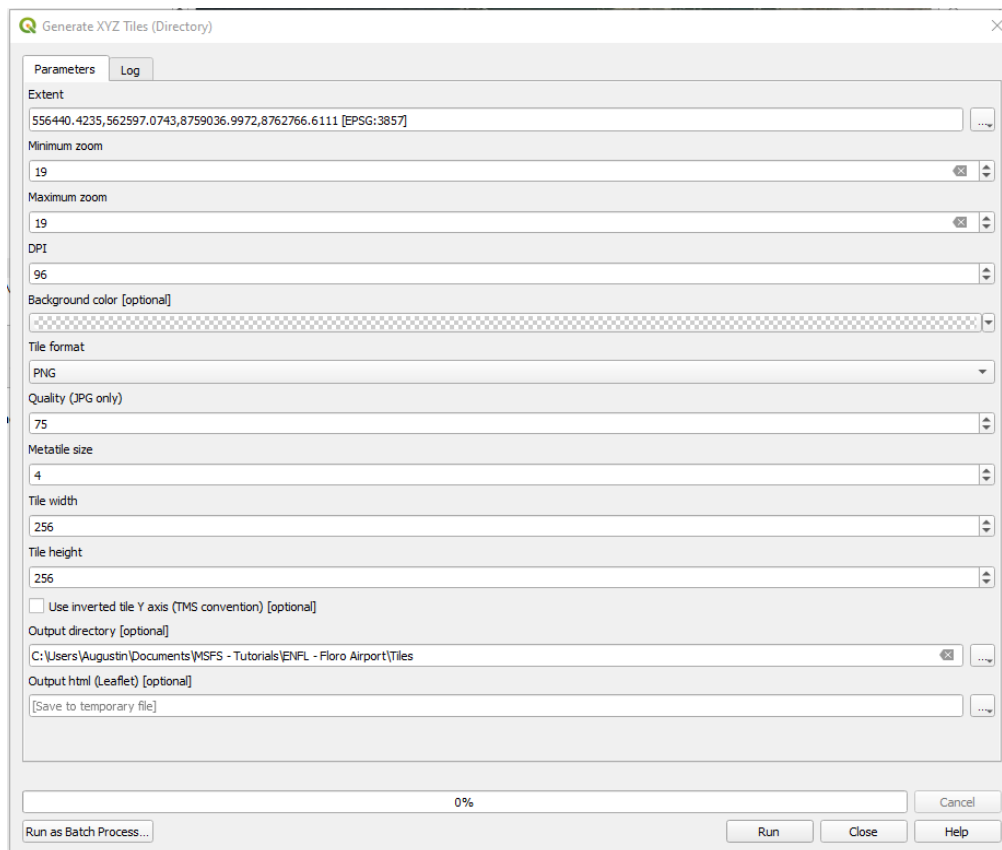
When it's done, you'll find a folder in you `Tiles` folder named after you zoom level, and inside that folder is many other sub-folders, and inside them, are the pictures of your aerial imagery
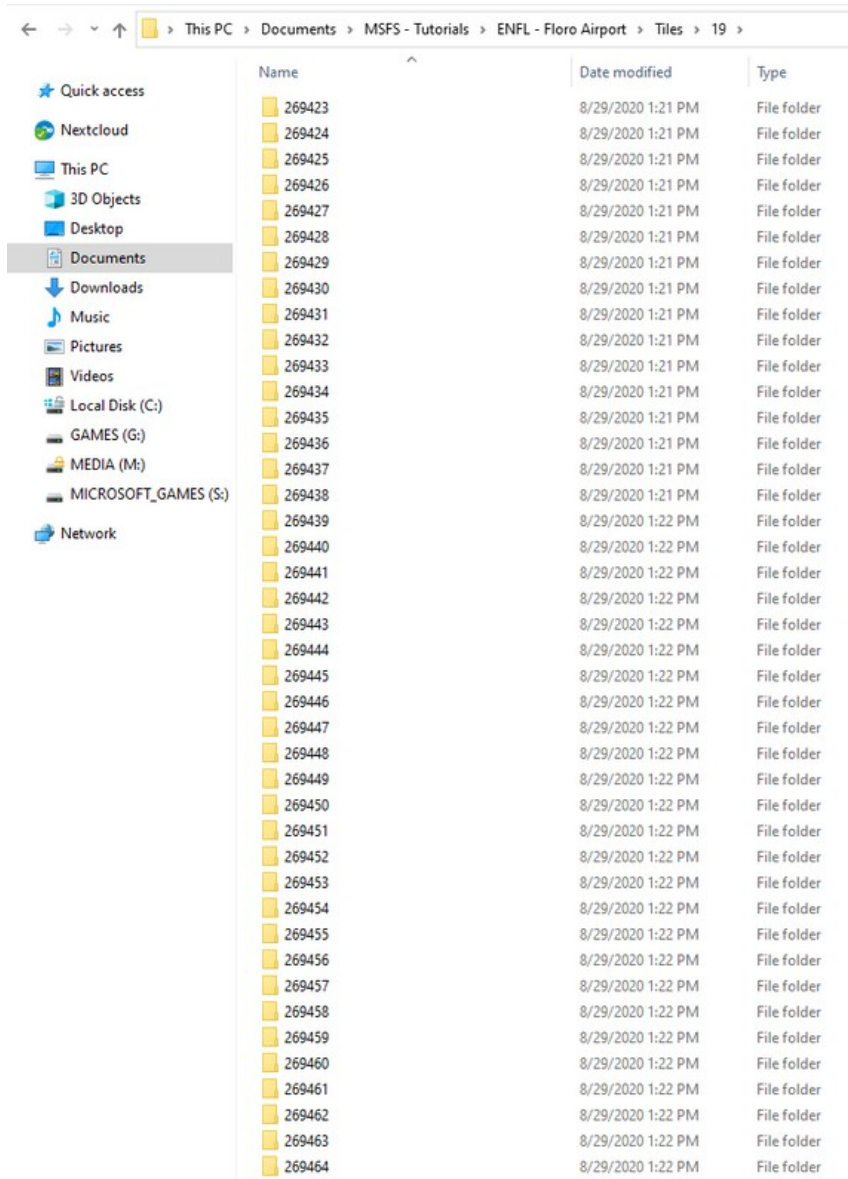
5 – tiles2bing

In your windows search bar type `cmd` and click om `Command Prompt`
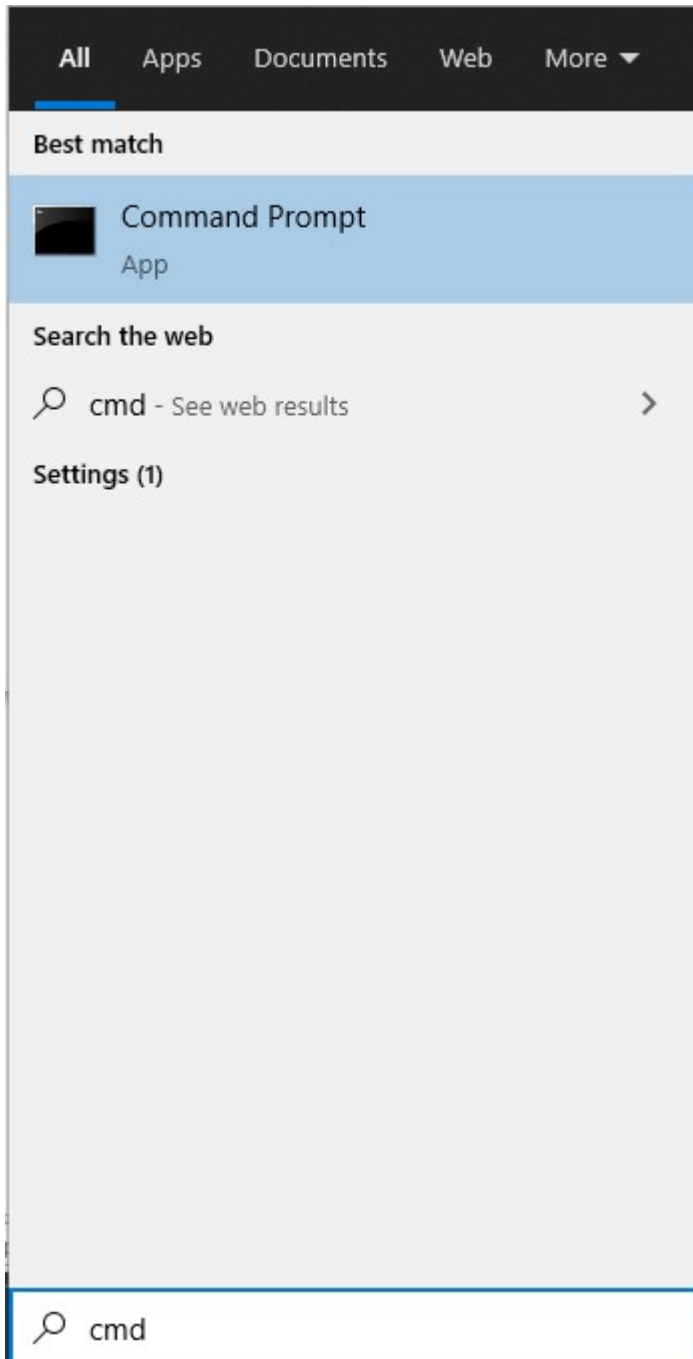
Now you need to type in `cd` followed by the path to where you have extracted tiles2bing, I have mine in `C:\Users\Augustin\Documents\MSFS - Tutorials\tiles2bing`

(If you are wondering how to find the path to certain folders, open the folder up in File explorer, and click in the bar where it's says where you are)
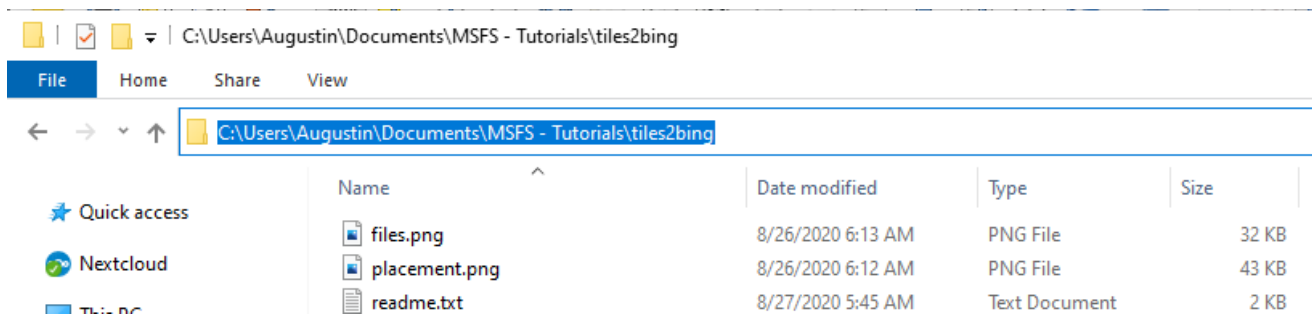
Now that we are in the tiles2bing, we can start to convert the images we have in out `"Tiles"` folder.

Type the command `tiles2bing "C:\Path\To\Tiles" /o "C:\Path\to\PackageSources\CGL\aerial_images" /y google`

Of course replace the `\path\to\` with your respective path, for me it's this:
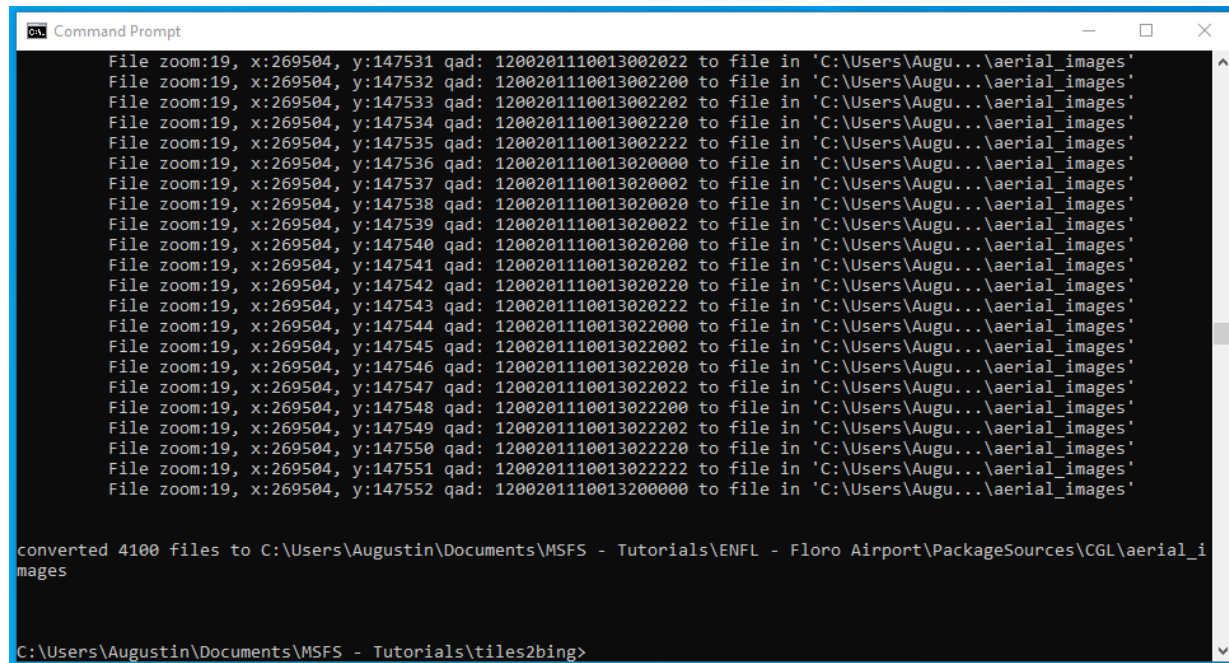
`tiles2bing`

`"C:\Users\Augustin\Documents\MSFS - Tutorials\ENFL - Floro Airport\Tiles"`

`/o "C:\Users\Augustin\Documents\MSFS - Tutorials\ENFL - Floro Airport\PackageSources\CGL\aerial_images"`

`/y google`

Remember to use the Quotes (") at each end of the folder paths.

If you get an error saying a `.dll` file is missing, install this:
https://dotnet.microsoft.com/download/dotnet-core/thank-you/sdk-3.1.401-windows-x64-installer

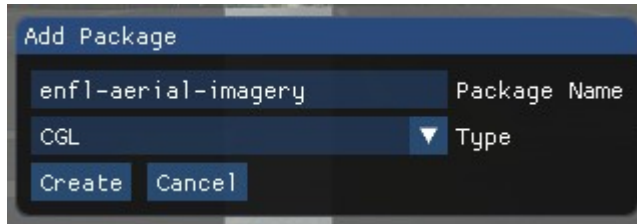When everything works smooth, the output should look like this

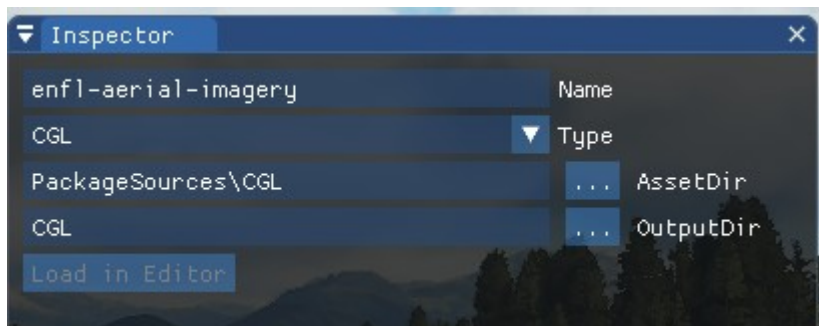And the `aerial_images` folder should be full up on your aerial imagery
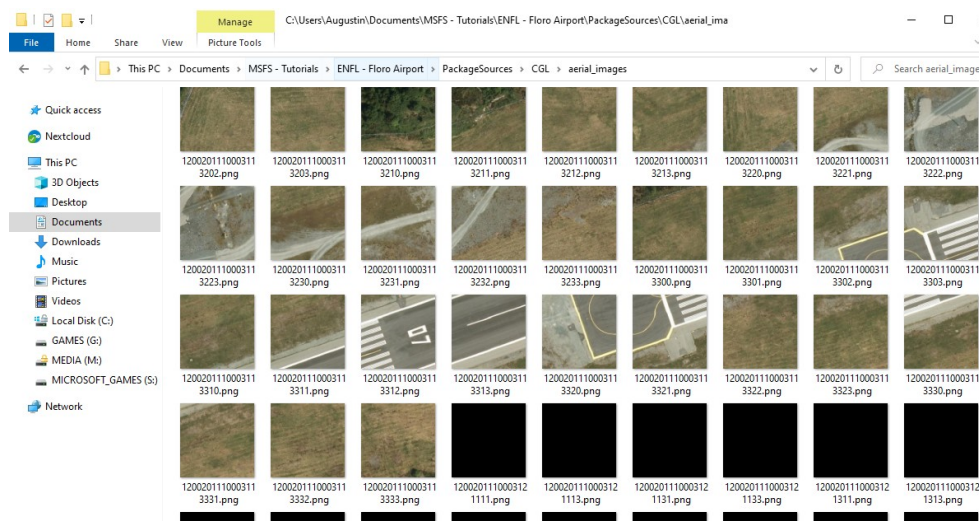
6 – Compiling

Start up MSFS and go to the place where you are to have your aerial imagery. Open up an existing project or create a new one.
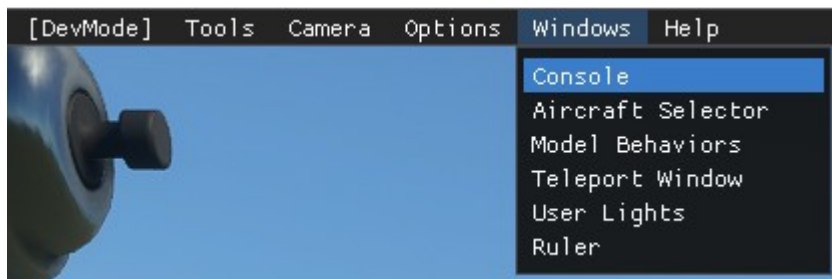
Create a new `CGL` ssset

Set the `AssetDir` to the `PackageSource\CGL` folder, and the `OutputDir` to `CGL\`


Save the project, and open up the console window and clear it so that we can see all the info that comes up when we build the imagery

This should be the output after you built your package if you're only building a CGL asset
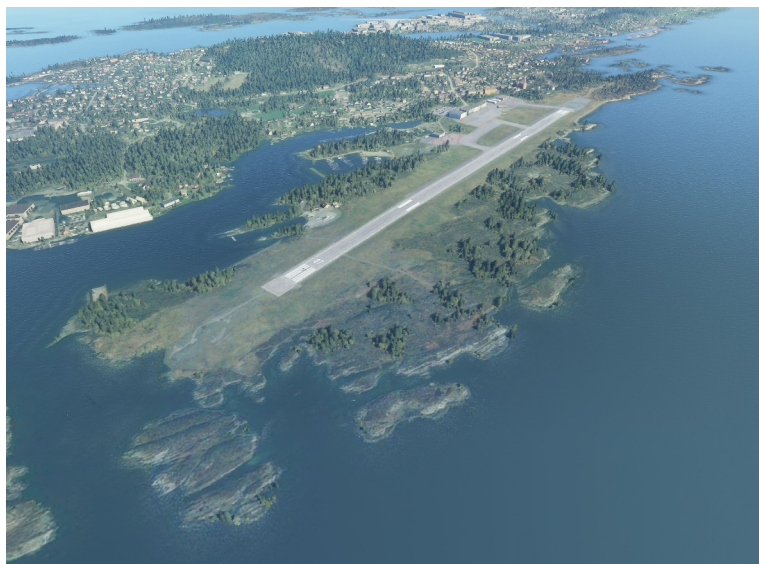*(Only error is that we don't have any ContentInfo folder, but that's not a problem in our case)*

You should now have a `Packages` folder in you project folder, and inside that folder is our newly built package!
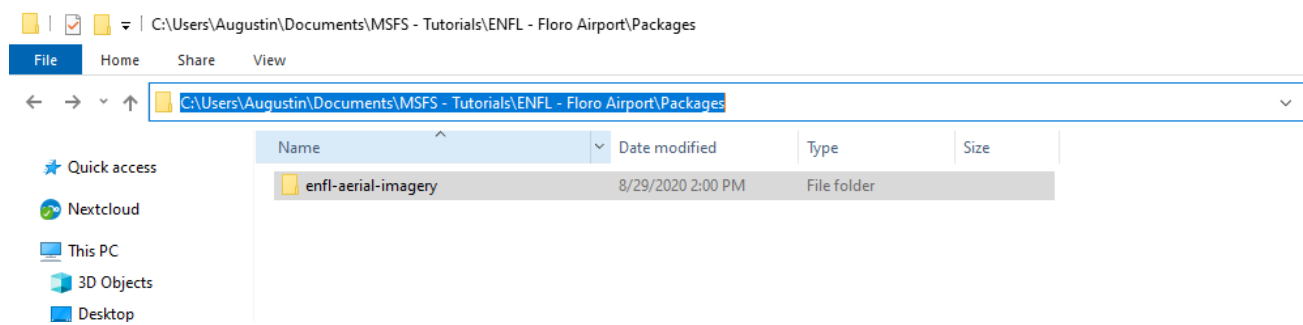
Place this package in your MSFS `Community` folder and restart the sim, and go back to the location of the aerial imagery

7 – THE FINAL RESULT

Before   **After**

Hope this guide/tutorial helped you!

I would like to thank both the developers of QGIS, Oscar Pilote and Christine Winther for making the tools necessary for doing this! You are legends!