

Unity GIS Tech 2018-2019



GIS Terrain Loader Documentation v1.0

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I. Overview

Description

GIS Terrain Loader is tool designed to load real world elevation files from GIS applications, by using this asset you can generate terrains in editor or at runtime.

This asset work with GlobalMapper-L3DT or any GIS application that able to export terrains in FLT (Float Point Elevation) format.

Specification

GIS terrain loader do not download data directly from internet online sources (providers) using unity but it can load exported data by GIS application (Global Mapper-L3DT...etc.) so it's completely offline tools

II. Downloading, preparing and exporting Real World data to GIS Terrain Loader

In this example, we will work with Global Mapper.



Why Global Mapper?

Global Mapper is an affordable and easy-to-use GIS application that offers access to an unparalleled variety of spatial datasets and provides just the right level of functionality to satisfy both experienced GIS professionals and beginning users.

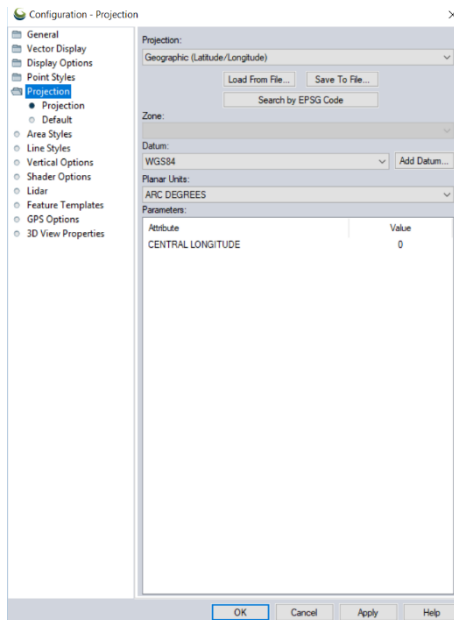
1- Configure Globalmapper projection :

Before starting, we must configure global mapper projection, to do that: From the main menu:

Select Tools→Configure→Projection

Be sure that the projection used is:

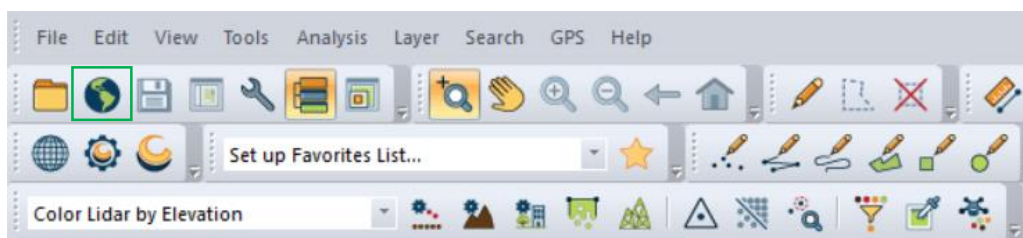
Geographic (Latitude/Longitude) Datum WGS84 Planer Units Arc Degrees



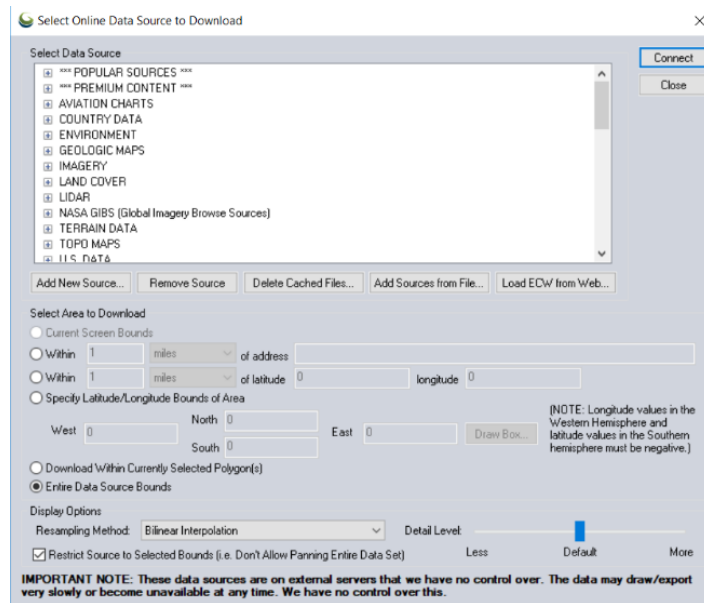
2- Downloading data from online sources :

Global mapper supports more than 300 spatial data formats so we have variety of online maps server to download raster-vector-...

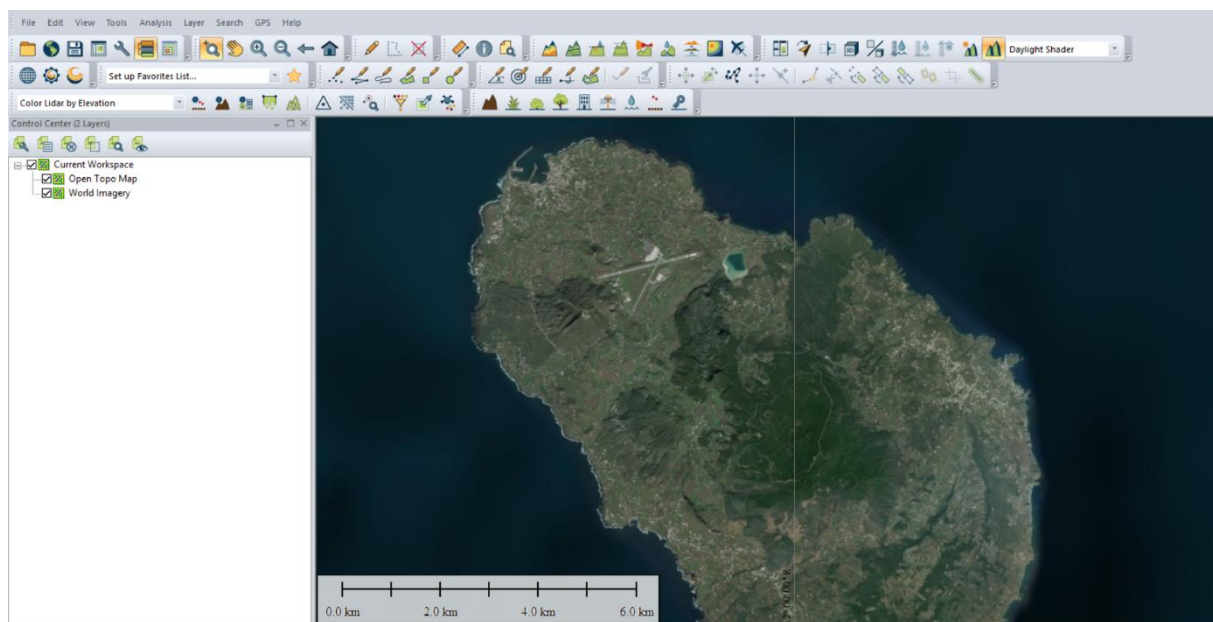
- To start using Online Sources Open Globalmapper and click on “Connect to Online Data”



We will have window that contains list of spatial data formats.

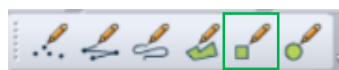


- Select for example : WORLDWIDE Data → World Imagery
- Use zoom in and zoom out and focus on the wanted area

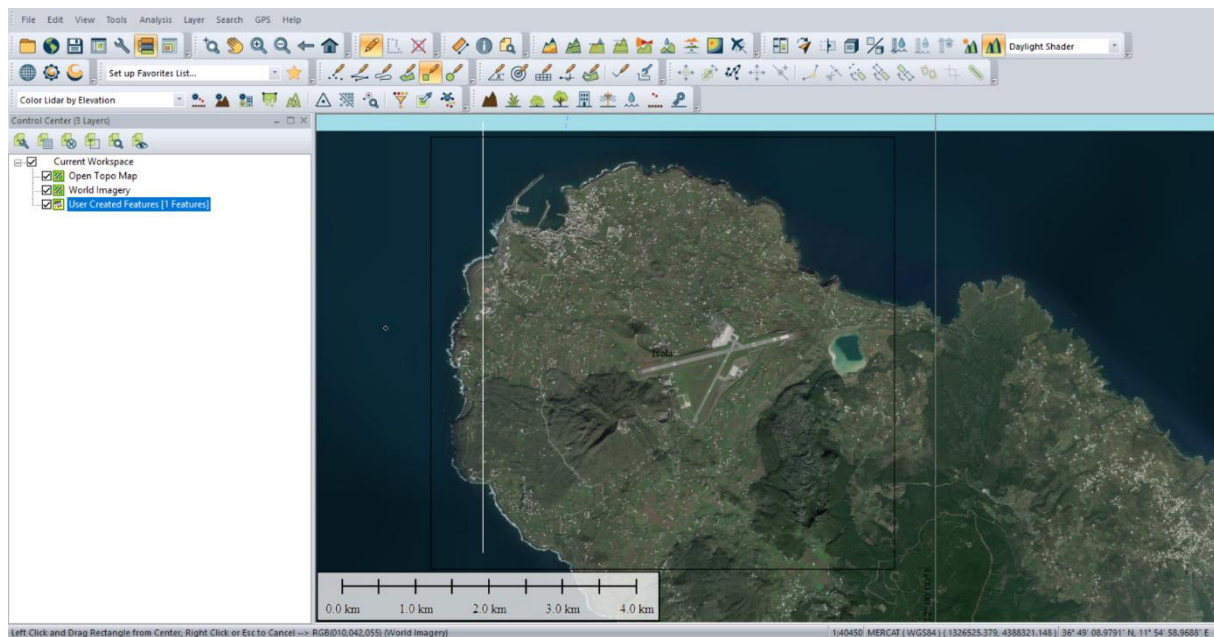


3- Select export bounds:

To order to limit the area that will be exported to unity we must draw layer rectangle bounds by the tools shown on the image, set name and click on OK button:

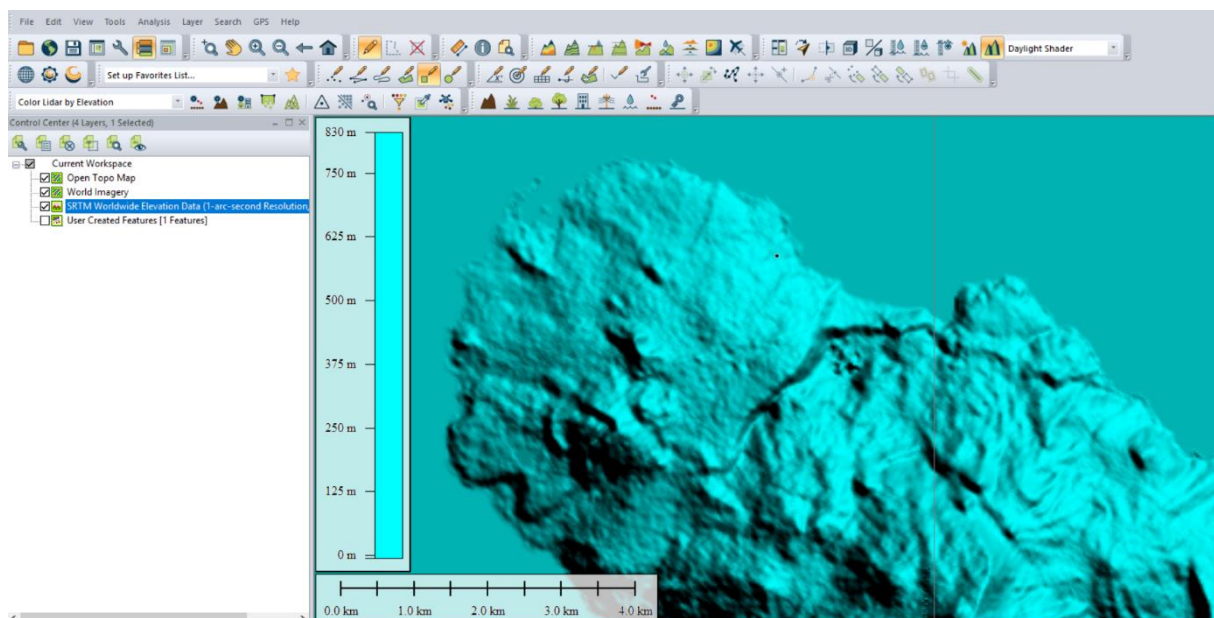


- The Selected bounds as black rectangle:



4- Exporting Terrain elevation data :

- Click on “Connect to Online Data” and select Terrain DATA → SRTM World Wide Elevation data (1-arc second resolution) or any data server.

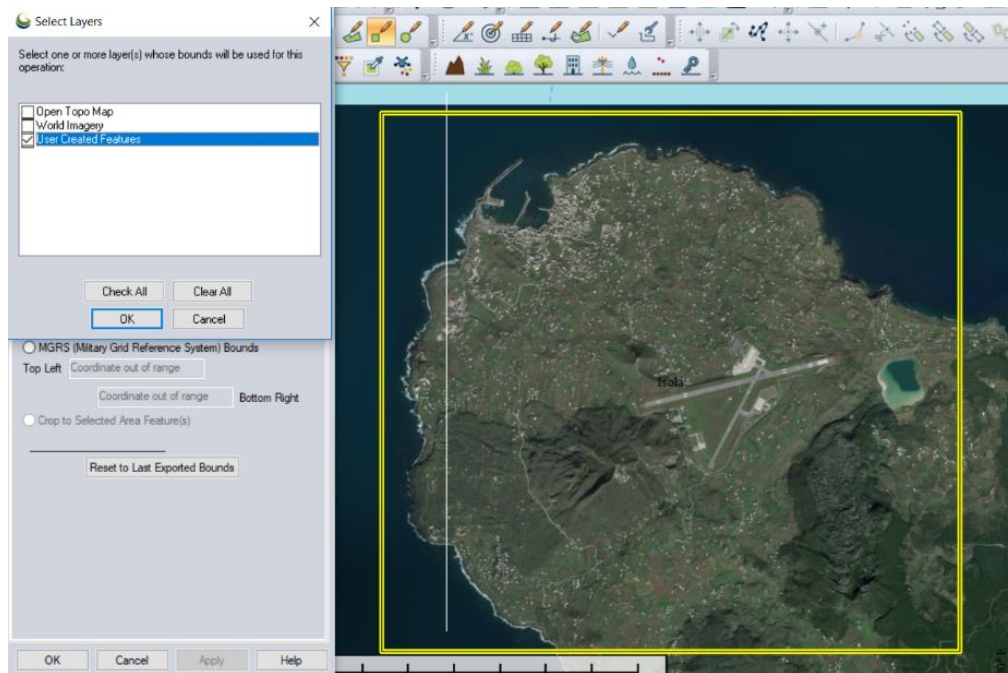


- Click on File → Export → Elevation Grid Format ->> select “Float/Grid File”.
- Click on Exporting bounds to select exported zone then click “OK” button.
- Save this terrain file with any wanted name to your Main Folder.

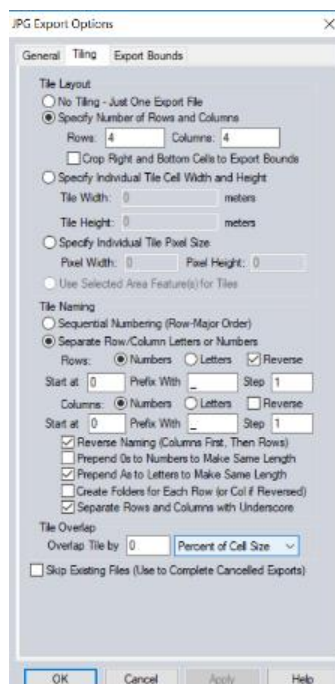
5- Exporting Raster data :

We know that raster \geq level 17 (zooming level) for large zone takes a lot of memory and space so for that will export raster data as tiles raster data if we use high zoom level.

- To export raster data click on : File → Export → Export Raster /Image format... ->>Select “JPG” or “PNG” Format.
- From Tab menu Select Export Bounds and click on “Use Layer Bounds” button, Select drawn rectangle layer that his bounds will be used in this operation and click OK :



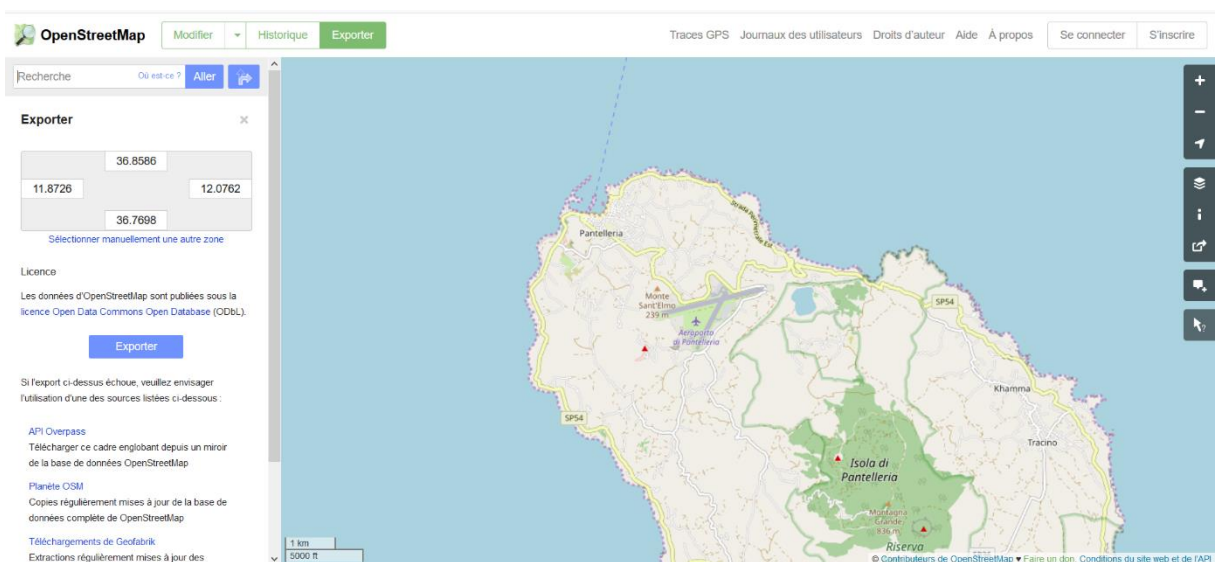
- Return now to Tab menu and click on “Tiling” button, Select specify number of rows and columns and set the number of tiles (example 4x4) to get images size \leq 5 Mb.
- Other parameters must be as it's shown in the picture bellow.



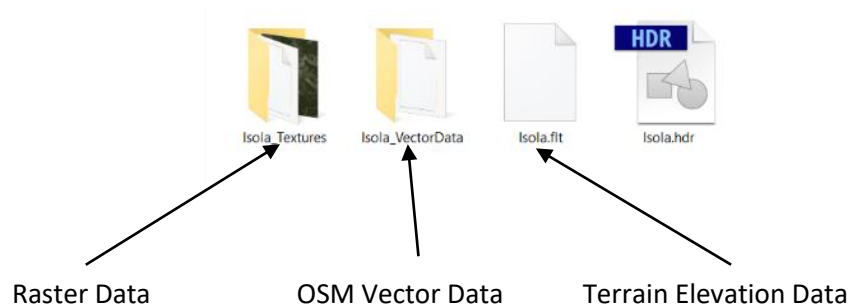
- Click on “General” button on the Tap Menu : check (TAB MapInfo) to georeference exported tiles .
- Click on “OK” button and set save name to “Tile”.
- Saved tiles must be on : Main Terrain Folder / TerrainFileName_Textures.
- Wait to finish downloading tiles.

6- Exporting OSM Vector data :

- Click on “Connect to Online Data” and select WORLDWIDE DATA → OpenStreetMap.org
- Vector map download from (www.openstreetmap.org)
- Click On “Connect” button, web page will be opened
- Click On “Exporter” button, save downloaded file to: Main Terrain Folder / TerrainFileName_VectorData.



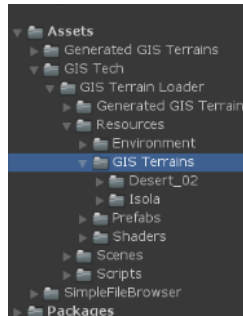
Files must be like this :



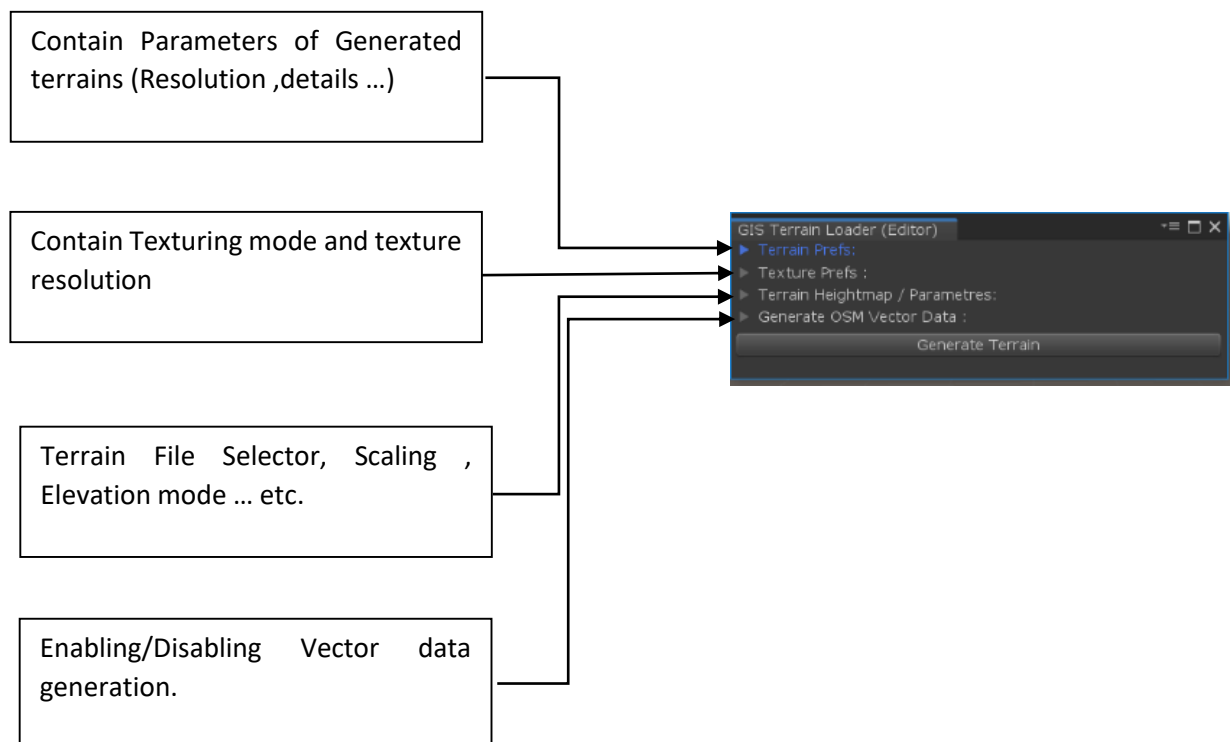
Files are ready to be used by Terrain GIS Loader

III. Importing data into Unity

- After installing GIS Terrain Loader in Unity Import main terrain folder to “Resources\GIS Terrains/” folder



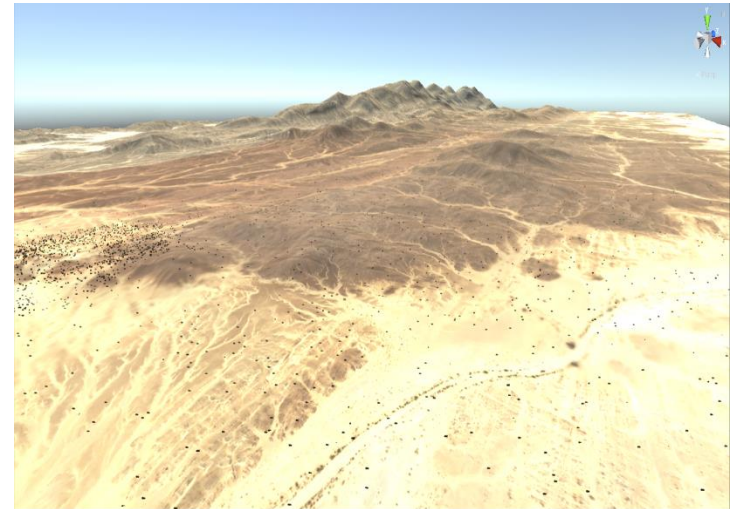
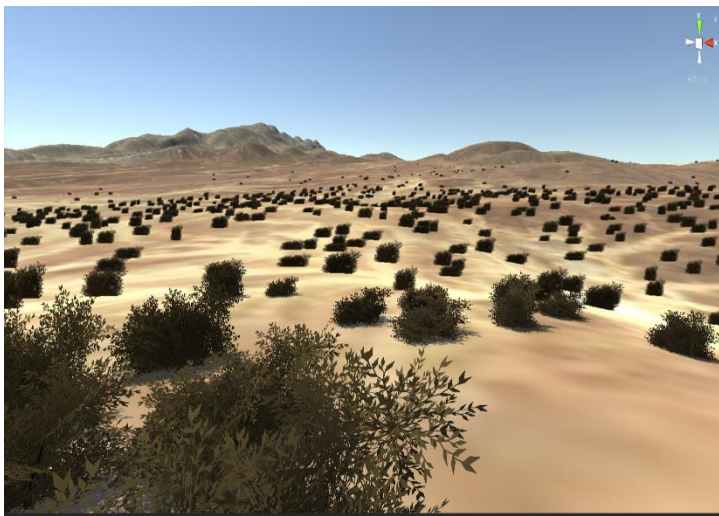
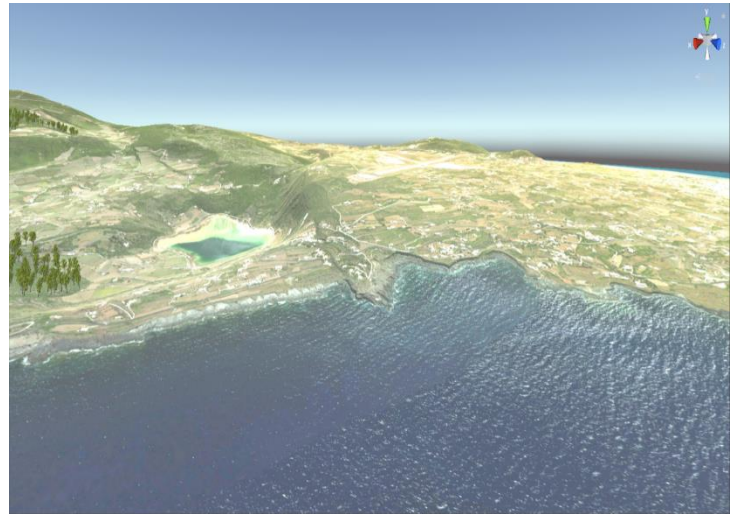
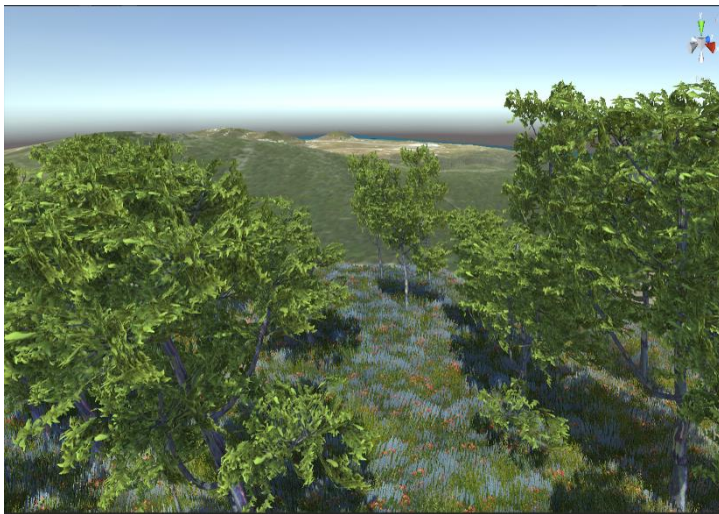
- Open GIS Terrain Loader Windows From : Tools → GIS Terrain Loader → Terrain Loader
This window will appear.



IV. Generate Terrain

- To generate terrain via GIS Terrain Loader we must set terrain file into “Terrain Heightmap / parameters” → “Set Terrain File (.flt)”.
- Chose terrain elevation mode (Real world elevation | | exaggeration).
- Set Terrain Scale vector Ex : (1,1,1).
- Enable/Disable Terrain height smoother and surface
- In “Terrain” Prefs Section Select Heightmap resolution , Detail Resolution ,...)
- In “Generate OSM Vector Data” section Enable/Disable (Tree,Grass.. Generation) set parameters
- Click on “Generate Terrain”.

All Generated Terrains will be found in “Generated GIS Terrains” folder.

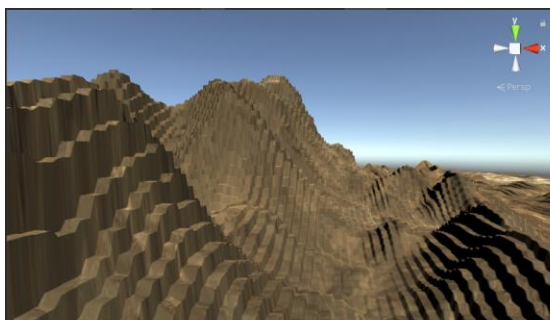
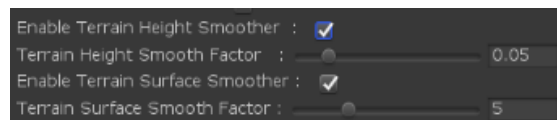


V. Terrain surface and height Smoothen operations

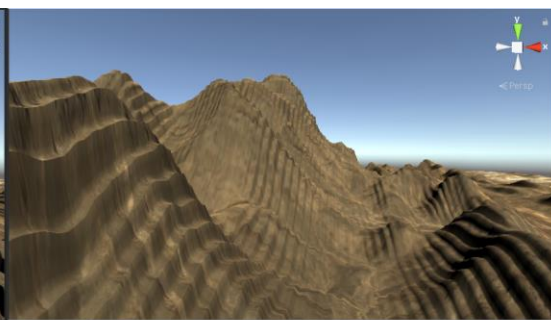
GIS Terrain Loader is able to smooth terrain surface and heights; this operation is useful when we find that generated terrains with unwanted jaggies, terraces, banding and non-smoothed terrain heights as the following pictures which shows a terrains with 1025 heightmap resolution.

Changing the surface smoother value to higher means more smoothing on surface while 1 value means minimum smoothing.

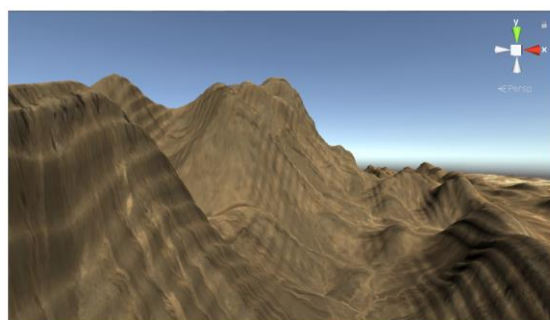
note that more smoothing steps result in more washed away surfaces and obviously losing some high frequency details.



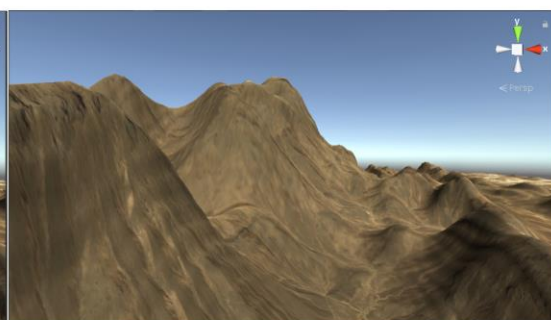
Terrain without smoothing Heightmap Resolution = 1025



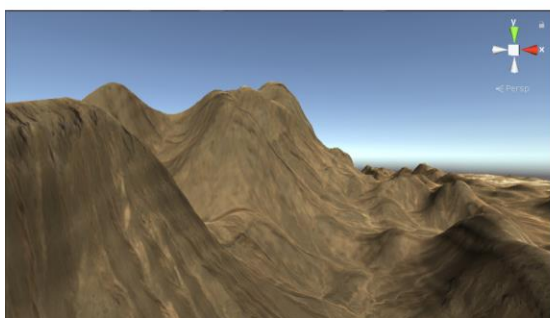
Surface smoothing X2



Surface smoothing x3



Surface Smoothing x5

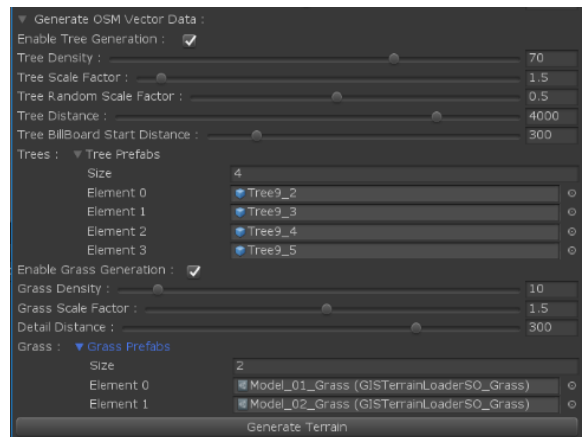


Surface Smoothing + Terraing Height Smoothing



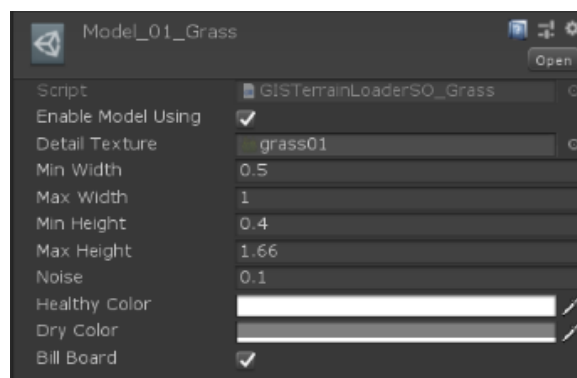
VI. Vector Data and Prefabs

If OSM Vector file exist, GIS Terrain Loader can automatically generate grass and trees based on real data obtained from OSM file.



Grass prefabs :

To create new grass prefab we must create new scriptable object and add GISYTerrainLoaderSO_Grass.cs into it like its shown in the picture bellow.



VII. Support

If you have something does not work or you find bugs please contact as on the forum page.

VIII. Links :

Support page :

<https://forum.unity.com/threads/released-gis-terrain-loader.726206/>

FaceBook Support Group :

https://www.facebook.com/groups/2842440552466636/?ref=br_rs

YouTube page :

https://www.youtube.com/channel/UCEQ-QEpPvbUqHksoxSB8_cQ

Email:

SalahKe2008@Gmail.com