Real World Terrain

Version 3.9



Infinity Code, 2013-2018

http://www.infinity-code.com/

Contents

Overview	4
Description	
Specification	
Updating from Real World Terrain v2.x	4
Using	
Generation of Gaia stamps	5
Generation of RAW files	6
Providers of tiles	
Using «Provider - Custom»	6
Commercial use	
Real World Terrain Window	8
Description of fields	8
History	10
Best Settings	10
Settings of Real World Terrain	10
Memory usage	10
Clear the cache	10
Helper	11
Usage of the helper	11
Alternative helper	12
POI	12
Additional features	12
Generation of additional elements	12
Regeneration	13
Utils	13
Overview	13
Building Manager	13
Object Placer	14
POI Manager	15
Scaler	15
Chavy Lagation	16

Post-processing of textures	17
Overview	17
Brightness, Contrast and HUE	17
Color Balance	18
Color Levels	19
Generate Grass from Texture	20
Generate SplatPrototypes from Texture	21
Export / import RAW data	21
Export Mesh as OBJ	21
Third Party Assets	22
Overview	22
Building BuildR Procedural Generator and BuildR2	22
EasyRoads 3D v3	22
Gaia	23
Online Maps	23
Playmaker	23
Relief Terrain Pack (RTP)	23
Road Architect	23
Volume Grass	24
WorldStreamer	24
Real World Terrain API	24
Updating versions	25
Troubleshooting	26
Known issues	26
Your problem is not listed	27
Frequently asked questions	27
Support	28
Final words	28
Links	28

Overview

Description

Real World Terrain is designed to generate Terrains, Meshes, Gaia stamps and RAW files, based on real Earth elevation data, and buildings, roads, grass, trees, based on data from Open Street Map.

With Real World Terrain comes utility that allows you to select the necessary part on Google Maps, a set of tools for post-processing terrains, textures, place objects on the map.

Specification

Real World Terrain uses:

- For elevation maps uses:
 - SRTM v4.1 elevation maps, accuracy of 3 arcseconds (90 meters). The relative error in height for the data of less than 6 meters.
 - SRTM 30. Accuracy of 1 arcseconds (30 meters).
 - o Bing Maps Elevation API. Accuracy: 10m USA, 90m 56° S 60° N, 900m other.
 - Mapbox. Accuracy is unknown.
- To create additional objects used Open Street Map data.
- To create textures used: ArcGIS, DigitalGlobe, Map Quest, Mapbox, Mapy.CZ, Nokia Maps (HERE.com), Virtual Earth (Bing Maps), Open Street Map.

Note: SRTM data do not contain water depth maps, so zero height is used for seas and oceans.

Updating from Real World Terrain v2.x

Real World Terrain v3.x is not compatible with Real World Terrain v2.x.

Before you import Real World Terrain v3 remove the old version of Real World Terrain.

Using

Select the menu item «Window / Infinity Code / Real World Terrain / Open Real World Terrain», to open Real World Terrain window.

Enter the coordinates of the area in decimal, configure the fields and click «Start».

Real World Terrain will automatically download the necessary elevation data, textures, Open Street Map data, create new GameObjects or files containing the specified area, and add them to the scene. For each Terrain creates an information block containing the coordinates, texture, and giving the opportunity to re-create it with the new settings.

Created terrains are stored in «Assets / RWT_Result».

IMPORTANT

Real World Terrain works with a lot of data, and can, depending on the settings to use a lot of memory.

We do not limit Real World Terrain settings, so you can get exactly what you want. But when a large amount of generated Terrains, you may get an error of memory, with crashes to Unity Editor.

To create the most detailed Terrains and avoid errors, we recommend the following steps:

- Create the desired area without textures, or with a minimum resolution (128 or less).
- Create a texture with the required resolution.
- Create additional objects.

After the successful completion of each step to save your scene.

Generation of Gaia stamps

Select the menu item «Window / Infinity Code / Real World Terrain / Open Real World Terrain», to open Real World Terrain window.

Enter the coordinates of the area in decimal, select «Result - Gaia Stamp», specify the required resolution and click «Start».

Note: Real World Terrain uses Gaia's built-in features to generate terrains, so only Gaia stamp is created.

Real World Terrain will create a new RAW object that contains elevation data.

RAW object will be scanned using Gaia Scanner and saved as Gaia stamp in «Assets / Gaia / Stamps / Bases» folder.

The new Gaia stamp will be opened in Gaia Stamper.

You will need to specify the required size, position and Base Level, and click «Stamp».

Read more about working with Gaia stamps in the Gaia documentation.

Note: If you do not have a Gaia Session Manager in the scene, the new Session Manager will be created.

Generation of RAW files

Select the menu item «Window / Infinity Code / Real World Terrain / Open Real World Terrain», to open Real World Terrain window.

Enter the coordinates of the area in decimal, select «Result - Raw File», specify the result type, filename, required resolution and click «Start».

Real World Terrain can generate two types of the result:

- RAW binary file where elevation values are linear and use a two bytes.
- **Mapbox RGB** image (PNG) where each elevation value is encoded in color. https://www.mapbox.com/help/access-elevation-data/

Providers of tiles

Real World Terrain can use to generate textures any source of the tiles in WGS84 WebMercator (SphericalMercator) projection.

Real World Terrain has presets for most known compatible sources of satellite tiles. If the source of the tiles you want to use does not have a preset, you can do it using "Provider - Custom".

Note: The preset for Google Maps tiles has been removed, because it has a limit on the amount of downloaded data. But if you really want to use it, you can do it using Provider-Custom.

The legal way to use tiles is Google Maps:

https://developers.google.com/maps/documentation/tile/[New]

Note: Some tile sources require AP keys (tokens), for example: DigitalGlobe, Mapbox.

Using «Provider - Custom»

To use «Provider - Custom» in the field «URL» specify a URL pattern for download tiles.

URL pattern supported tokens:

```
{zoom} – Zoom level.
```

 $\{x\}$ – Tile X.

 $\{v\}$ – Tile Y.

{quad} – Tile Quad Key. Uses in Virtual Earth (Bing Maps).

General instructions:

- 1. Open in a browser map on the site of provider, tiles from which you want to use.
- 2. Open a browser developer tools. Hotkey in most browsers F12.
- 3. Find the address of tile.
- 4. The address replace the numbers that are responsible for the tile zoom, x, y, to tokens.
- 5. Insert the URL pattern into the field «URL».

Commercial use

You can use terrains, buildings, roads, rivers, trees, grass, created with Real World Terrain, for commercial purposes.

The rights to the commercial use of textures depending on the selected provider. You are responsible to read the license agreement on the provider's site.

Real World Terrain Window

Description of fields

Along with most of the fields added icons, when you hover on which you can read a summary of the field. Clicking on the icon will open a detailed description of the field.



File - allows you to export and import settings.

History - contains the history of generations.

Settings - opens the settings window.

Decimal coordinates - the coordinates of the top-left and bottom-right corners of the area in decimal format.

Title - a description of the current generation. Used only in history.

Insert the coordinates from the clipboard - inserts the coordinates copied in the helper.

Run the helper - open the helper.

Get the best settings for the specified coordinates - opens the wizard that will help you get the best result.

Show Open Street Map - opens Open Street Map in the browser on your current location. It is useful to know which objects are marked on the selected area.

Result type - the type of object being created.

- Terrain standard Unity Terrain. After creating the object, you will be available built-in tools to work with the Terrain.
- Mesh
- Gaia Stamp
- RAW file

Count terrains - the number of new terrains by longitude and latitude.

Size type - the method of determining the size of created Terrains.

- **Real world sizes.** Width equal to the average of the lengths of the upper and lower parallels. Height equal to the length of the meridian.
- Mercator sizes. The size of one degree of latitude and longitude is fixed.
- Fixed Size. Each terrrain or mesh will have a fixed specified size.

Scale - a scaling factor to the new area.

Max elevation - the maximum height of the new area.

- Auto detect the maximum height is determined automatically. Recommended.
- Real World Value the maximum height is 15,000 meters.

Max underwater depth - the value used when no value of the height map. Usually it is the sea, oceans, lakes. Uses the absolute depth, such as «-30».

Detail Resolution - resolution map Detail Map.

Resolution Per Patch - indicates the size in pixels of each Detail Path.

Base Map Resolution - resolution Base Map.

Height Map Resolution - resolution height map.

Create prefab - specifies whether to create prefab, in the folder results. Create prefab takes some time.

Elevation Provider – provider of elevation data.

- SRTM
- Bing Maps. Required Bing Maps API Key.
- **SRTM 30.** Required a login / password for earthdata.nasa.gov.
- Mapbox. Required a Mapbox API key (public token).

Generate textures - indicates whether the created texture.

Provider - the source that will be downloaded texture. Textures derived from different providers vary in quality, maximum detail and conditions of use.

Type - the type of texture map.

Count textures - number of created texture. Only Mesh.

Texture width / height - size of the texture created for each terrains.

Max level - the highest level of approximation for the textures.

Generate buildings - specifies whether to create buildings and walls.

Generate roads - specifies whether to generate roads. This field will be available if the integration with EasyRoads3D v3 or Road Architect is enabled.

Generate trees - specifies whether to create trees.

Generate grass - specifies whether to create grass.

History

It contains the history of all runs Real World Terrain.

Each record contains fields:

- Number.
- Title. If the title is empty, then the coordinates of the area are displayed.
- Time of starting the generation.
- > restores the generation settings.
- X remove a record from the history.

Best Settings

If you do not know what settings to use for the selected area, click «Get the best settings for the specified coordinates». Move the sliders to the desired quality setting and press «Apply».

Settings of Real World Terrain

To open the Settings window, click «Settings» in the upper part of the window.

In the settings you can:

- Change the folder of the application cache. This is useful if you want to use a shared cache for multiple applications.
- Specify the name of the created GameObject.
- Enable or disable working with third-party assets. To enable will be available only assets that are present in the project.

To return to the default settings, click «Revert to default settings».

Memory usage

Click «Memory Usage» in the main window of Real World Terrain to open Memory Usage window.

This window displays the uncompressed size of terrains and textures, after being generated with the current settings.

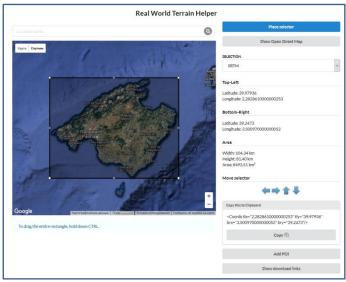
Only the main fields affecting the size of the result are shown.

Important: This window does not show the memory that Real World Terrain will use to generate the result.

Clear the cache

Real World Terrain uses a large amount of data that it caches in the folder «RWT_Cache». If this data is not more than you need, you can clear cache by pressing the «Clear cache» in the Real World Terrain.

Helper



Usage of the helper

Click «Run the helper», to show a helper. Helper will run in the default browser with the coordinates specified in Real World Terrain.

Helper contains:

- A search box.
- Google map with a frame added to it that indicates the area that will be used in Real World Terrain. The frame can be resized and moved. To move the entire frame, hold down «CTRL».
- Block information on the current position, the code to copy and control buttons.
 - o Add POI adds a new POI (point of interest) in the center of map.
 - Place selector fits the frame to the visible area of the map and set the frame size 70% of the visible area.
 - Show Open Street Map opens in a new tab «openstreetmap.org» in the same position in which the map in the helper.
 - Show download links shows the download links height maps.
- Block POI lists all the POI on the map. What would change the title of the POI, double-click on the title. POI on the map supports Drag and Drop.
- Download links height maps of the selected area.

Place the frame on the desired area on the map, select and copy the text in the block «**C**opy this to Clipboard». In Real World Terrain, click «Insert the coordinates from the clipboard» and selected in the helper coordinates frame will be inserted into Real World Terrain.

Alternative helper

If you have any problems when using the built-in helper, you can use an alternative helper:

http://service.infinity-code.com/RWT Helper/RWT Helper.html

POI

Contains a list of points of interest. After creating the terrains all the POI will be placed in right places. You can quickly navigate to the desired POI double-clicking on the line in the window «Hierarchy».

Use the utility «POI Manager» to comfortably work with POI.

Additional features

Generation of additional elements

Real World Terrain can automatically create buildings, roads, trees and grass, based on real data from Open Street Map.

Before the creation of additional objects please visit **www.openstreetmap.org**» and make sure that you are required objects are marked on the map. In Europe, perfectly marked, almost all of the city. In America, most buildings are not marked.

Important: the created objects may be slightly different from the picture on the texture. This is because the layout objects in Open Street Map. If the building is present on the texture, but not created, then it means that it is not marked in Open Street Map.

For buildings and walls added a description of all available tags Open Street Map. For many of the buildings there including address, name, height, etc.

For buildings and walls are automatically generated UV-maps.

If the tag contains the height or number of floors, the object will be created with the correct height. You can always correct height, specifying the desired value and pressing the «Update». For buildings can change the type and height of the roof.

If the building was created with the wrong normals walls or roof, you can quickly fix it by pressing «Invert wall normals» or «Invert roof normals» respectively.

Regeneration

You can recreate the already created objects with the new settings. To do this, select «RealWorld Terrain» in the «Hierarchy» and click:

Regenerate terrains - to change the parameters Terrains.

Regenerate textures - to create textures with the new settings.

Regenerate additional - to rebuild the buildings, roads, trees and grass.

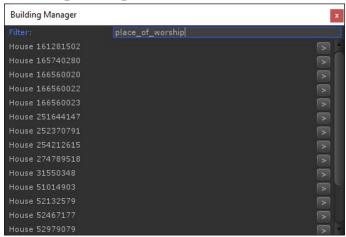
Utils

Overview

Real World Terrain contains a set of tools that will be useful for the search and placement of objects on the map, working with the POI, etc.

These tools are grouped in «Real World Terrain Container / Utils».

Building Manager

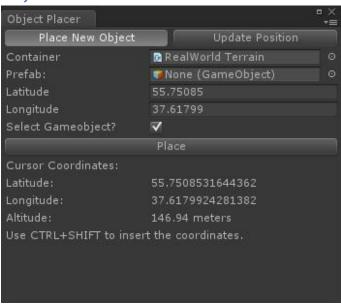


Tool to search the buildings.

It allows you to filter the buildings on the values of tags.

Enter the street name, house number or any other information contained in the tags, and will show buildings that contain tags with the specified value.

Object Placer



A tool for placing objects on the terrains by geographical coordinates.

This tool works in two modes:

- Creating a new GameObject at the specified coordinates.
- Updating existing provisions GameObject.

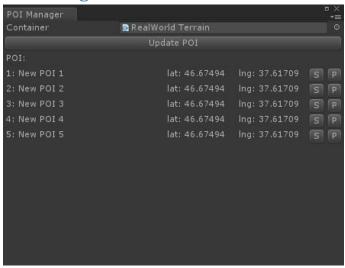
To create a new select GameObject «Place New Object», specify prefab and coordinates, and click «Place».

To update position of existing GameObject select «Update Position», specify GameObject and coordinates, and click «Update».

Place your cursor on the terrains, to see the location under the cursor.

Press «CTRL + SHIFT», to insert the coordinates under the cursor in coordinates fields.

POI Manager

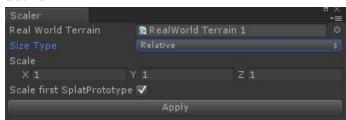


POI management tool created using the helper or specified before generating.

For each POI is displayed: name, coordinates and buttons:

- S Select POI GameObject.
- P Open the POI in Object Places.

Scaler



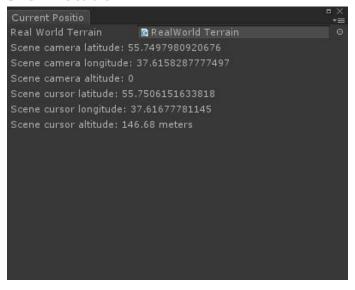
Tool to change the size of terrain in the scene.

It works in two modes:

- Relative. Specify the relative scale of terrains and click Apply.
- Absolute. Specify a new absolute size for terrains and click Apply.

Scale first SplatPrototype allows you to adjust the size of the texture so that it looks correct after scaling.

Show Location



The tool, showing the geographical coordinates of under cursor and the scene view camera.

Post-processing of textures

Overview

Real World Terrain contains set of tools for post-processing textures.

These tools are grouped in «Real World Terrain Container / Postprocess».

Brightness, Contrast and HUE



Tool to adjust brightness, contrast, hue and saturation of the image.

Left - the original image, to the right - a preview of the result.

Specify the required values using the sliders and press «Apply».

Color Balance

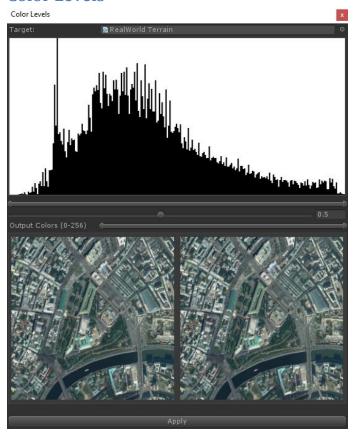


Tool to change the color balance of the image.

Left - the original image, to the right - a preview of the result.

Specify the required values using the sliders and press «Apply».

Color Levels

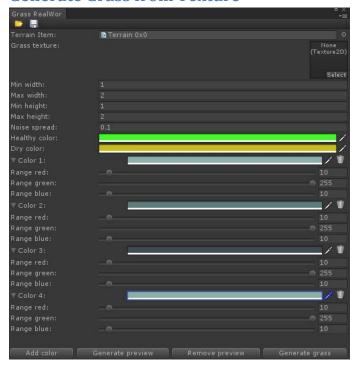


Tool to change the color range of the image.

Left - the original image, to the right - a preview of the result.

Specify the required values using the sliders and press «Apply».

Generate Grass from Texture



Tool to generate grass based on texture.

Add grass texture, and specify grass parameters.

Add colors, which will be created grass.

To work was faster for each color indicates range of values.

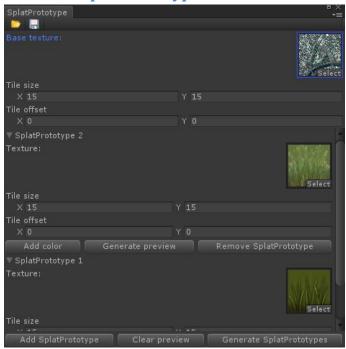
Click «Generate preview», to see the area to be created grass.

Click «Generate grass», to create grass and close the window.

You can save and load settings using the buttons at the top of the window.

To remove the grass, remove the relevant Detail in a script «Terrain».

Generate SplatPrototypes from Texture



Tool to generate SplatPtototypes based on texture.

Add base texture, specify parameters. Base texture will be used for all terrain. Add SplatPrototype, you want to use. For each SplatPrototype add color, so it will be created.

To work was faster for each color indicates range of values.

Click «Generate preview», to see the area to be used corresponding SplatPrototype.

Click «Generate SplatPrototypes», to create SplatPrototypes and close the window.

You can save and load settings using the buttons at the top of the window.

Export / import RAW data

Real World Terrain can export and import RAW data: heightmaps, detailmaps, alphamaps and texture.

Select generated terrains, and in «Real World Terrain Container / Export / Import Raw» select a menu item.

In the export / import window specify the required color depth (8 or 16 bits) and the order of the bytes (Windows or Mac).

Export Mesh as OBJ

To export a mesh, select «Real World Terrain Container» or «Real World Terrain Item» and click «RAW / Export OBJ».

Third Party Assets

Overview

Third-party assets is not contains on Real World Terrain and integration is disabled by default.

Import the asset into your project and enable integration in Real World Terrain settings.

If you want to remove the asset from the project, first disable it in Real World Terrain settings.

If you forget to to disable asset and removed it, you will see an error in the console. To manually remove the integration with the asset, open PlayerSettings (Edit / Project Settings / Player), and remove the corresponding entry from «Scripting Define Symbols».

Building BuildR Procedural Generator and BuildR2 https://www.assetstore.unity3d.com/en/#!/content/82220

It allows you to generate procedural editable buildings.

Supported BuildR v1.x and BuildR2.

How to generate buildings using BuildR:

- Enable integration with BuildR in Real World Terrain settings;
- Real World Terrain / Generate Buildings ON;
- Real World Terrain / Building Generator BuildR.

All buildings generated using Real World Terrain is editable, and you can completely change the style and setting of the buildings.

EasyRoads 3D v3

https://www.assetstore.unity3d.com/en/#!/content/469

It allows you to generate editable roads.

How to generate the roads using EasyRoads 3D:

- Enable integration with EasyRoads 3D in Real World Terrain settings;
- Real World Terrain / Generate Roads ON.

All roads created by the Real World Terrain is editable.

Note: only supported EasyRoads 3D v3. EasyRoads 3D v2.x is not supported.

Gaia

https://www.assetstore.unity3d.com/en/#!/content/42618

A great all-in-one tool for generating terrains.

The integration of this asset does not need to enable or configure.

You just need to have Gaia in the project.

Online Maps

https://www.assetstore.unity3d.com/en/#!/content/13261

It allows you to show the location from Real World Terrain on a dynamic map.

Integration with Online Maps enabled using OnlineMapsRWTConnector component.

Add this component to the map GameObject, and click «Enable Real World Terrain».

Playmaker

https://www.assetstore.unity3d.com/en/#!/content/368

The powerful visual scripting solution to quickly make gameplay prototypes, A.I. behaviors, animation graphs, interactive objects, cut-scenes, walkthroughs...

To enable integration with Playmaker, select «Window / Infinity Code / Real World Terrain / Packages / Playmaker Integration Kit»

or

import «Assets / Infinity Code / Real World Terrain / Packages / RWT-Playmaker-Integration-Kit.unitypackage».

Relief Terrain Pack (RTP)

https://www.assetstore.unity3d.com/en/#!/content/5664

Great shader for terrains. Using this shader, the result will look a lot better.

Relief Terrain Pack does not require configuration. Just enable integration with Relief Terrain Pack in Real World Terrain settings.

Road Architect

https://github.com/MicroGSD/RoadArchitect

Allows generating roads.

How to generate roads using Road Architect:

- Enable Road Architect support in the settings;
- Real World Terrain / Generate Roads ON.

All roads created using Real World Terrain is editables.

Volume Grass

https://www.assetstore.unity3d.com/en/#!/content/436

It allows you to generate a volumetric dynamic grass.

How to generate the grass using Volume Grass:

- Enable the integration with Volume Grass in Real World Terrain settings;
- Real World Terrain / Generate Grass ON;
- Real World Terrain / Grass Generator Volume Grass.

Note: If you try to generate the grass outside the terrains, Volume Grass can cause freezing of Unity Editor.

WorldStreamer

https://www.assetstore.unity3d.com/en/#!/content/36486

Keeps objects in the separate scenes, and dynamically load them during use.

This allows you to greatly increase the performance of your application.

How to use WorldStreamer:

- Enable the integration with WorldStreamer in Real World Terrain settings;
- Generate all terrains;
- Real World Terrain Container / Finish / Open WorldStreamer.

Real World Terrain API

Detailed information about all the available classes, methods and fields can be found in API Reference. http://infinity-code.com/docs/api/real-world-terrain/

The order of the values in the coordinates:

Vector2, Vector3: X - longitude, Y - latitude;

Parameters of methods: first - the longitude, second - the latitude.

Updating versions

In Unity Asset Store, we will send only the stable version. Renewal period is several months.

Real World Terrain has built-in update system, using which you can update Real World Terrain to the latest version and get early access to all versions and updates.

Click «Window / Infinity Code / Real World Terrain / Check Updates», to open the window checking for updates. Enter your Invoice Number (digits only), select a channel of updates and click «Check New Versions». Download the new version and import it into the project.

Important: Always make backups when upgrading assets or Unity Editor.

Removing the old version in most cases is not necessary.

You can find out your Invoice Number in order confirmation, or visit the account transaction page in Unity Asset Store:

https://www.assetstore.unity3d.com/en/#!/account/transactions

If from the current version was released more than 10 updates in the selected channel then will only show the last 10 updates.

If updates are available, you can read the list of changes and download the update.

If you have any problems with installing the update, then:

- 1. Open an empty scene.
- 2. Delete the folder «Infinity Code / Real World Terrain».
- 3. Import the new version of Real World Terrain to the project.

If you want to return to the previous version of Real World Terrain, select the channel «Stable Previous». Using this channel, you can get 10 previous updates.

Real World Terrain automatically checks for updates every 24 hours. If a new version is available, you will see a red button in Real World Terrain. When clicked, will open check for updates window.

Automatic check for updates does not require Invoice Number, and works on the selected channel updates. If you do not select a channel update, it will be checked only stable versions.

Troubleshooting

Known issues

You have trouble downloading elevation maps in Real World Terrain, or you want to download them manually (eg on another computer)

Follow these steps:

- Select the desired area in the helper.
- Press the «Show download links».
- Download the files.
- Put the files «*.asc» from the archives to folder «{Project} / RWT_Cache / Heightmaps».
- Start Real World Terrain.

You have trouble downloading textures

Try to choose another texture provider.

Visible gap between terrains

Most likely your terrains have lost their neighbors.

Select «Real World Terrain Container / Utils / Update Neighbors».

For your area is not generates buildings, roads, grass or trees

Please make sure that they are marked on Open Street Map.

To open the current area in Open Street Map, click «Show Open Street Map» in Real World Terrain window or the helper.

Building has inverted normals

Select the building and click «Invert normals».

How to create an intersection in Road Architect

Select the nodes that must intersect, enable "Allow intersect", and move first node close to the second node.

When working with terrains Unity 2017.3 is crashes

This is a problem in Unity Editor and not in Real World Terrain and it can be reproduced without assets at all.

Proof: https://www.dropbox.com/s/s2tv8s1qcngex0g/2018-03-25%20-%200001.mp4?dl=0

Solution: Use any other version of Unity Editor.

You have lost your Invoice Number and it is missing from the Unity Asset Store / Account / Transactions

We do not know Invoice Numbers of the customers. We can only check the number that you will give us. So contact with support of Unity Asset Store.

https://support.unity3d.com/hc/en-us/requests/new

Your problem is not listed

Please write us about your problem (support@infinity-code.com). We will try to fix all errors and release an update as soon as possible.

Frequently asked questions

Q: What is the maximum area can be created.

A: We are at a time creating an area of 10x10 angular degrees. It's a little larger than the size of Germany. But the maximum created territory, strongly depends on the settings of Real World Terrain.

Q: Can Real World Terrain generate terrain in runtime.

A: No, Real World Terrain is an editor extension and works only in Unity Editor. If you need a runtime solution, look at Online Maps.

https://www.assetstore.unity3d.com/en/#!/content/13261

Support

We provide support by email (support@infinity-code.com) in English and Russian or in the forum (http://forum.infinity-code.com) in English.

If something does not work for you, you find a bug, have a suggestion or question, contact us.

When contacting, please specify your version of Unity, OS and the version of Real World Terrain.

We always try to answer all requsts to the support within 24 hours.

Important: We do not provide support in the reviews section of Unity Asset Store. All questions in the reviews will be ignored.

Final words

We sincerely hope that you will enjoy using Real World Terrain, and this will save you a lot of time.

If you have any questions or problems, please contact us.

We will try to help you as quickly as possible.

Please do not forget to leave your review in Unity Asset Store.

It is very important for us to have feedback from users to make our assets better.

For other users, it is also very important to make a right understanding of this asset.

Links

Product page: http://infinity-code.com/products/real-world-terrain

API Reference: http://infinity-code.com/docs/api/real-world-terrain/

Forum: http://forum.infinity-code.com

Support: <u>support@infinity-code.com</u>

Videos: https://vimeo.com/channels/realworldterrain