DSFbuilder

MESH GENERATOR

For X-Plane 10 & 11

Save your time!

HSimulators

DFSbuilder V 1.0

Distribution Scenery Format Builder

What is DSFbuilder?

Distribution Scenery Format Builder

Is a Manager and helper on the construction process of the Mesh Terrain (*.dsf) generated by the Meshtool program for X-plane, 10 and 11 versions. The Meshtool for your time is a development tool available for free by Laminar Research X-Plane, which through the command line in the DOS prompt is able to compile files using existing database in DEM (Digital Elevation Model), in format *.hgt, * .tif , combined with the format *. XES (Land Classification or Landclass).

To use the Meshtool by the traditional way is very boring. Enter repetitive commands line in DOS prompt, instructing the PC to read and interpret data from digital models of terrain (hgt or tif) combined with terrain classification model, in addition to submitting a script (SCP.txt) programmed by the user according to your need in the construction of the scenery. Manually is a dull task, which usually raises obvious typing errors. The **DSFbuilder** is a facilitator of this process, ideal for those who want to generate mesh terrain sceneries in X-Plane quickly and quite comfortable, without extensive typing command lines in the case of building large areas.

What makes DSFbuilder?

Automates the process of creating the repetitive tasks of the Meshtool command creating DSF format files (Distribution Scenery File), organizing them geographically in the respective folders equal in X-Plane 10 and 11. Assists in editing of the script, which in DSFbuilder is already a preset editable named SCP.txt file that can be edited through a window in the DSFbuilder, allowing to modify and save according to the needs of the developer. The DSFbuilder also creates HGT.log and XES.log files, which are HGT data files that are with problems at the source. For example, if the user has 100 *.hgt files compiling and one of them contains error, the DSFbuilder will report points to be patched and recompiled in isolation.

What you need to do?

It is known that before generating a mesh literally speaking you must acquire all necessary data and put together a well-written, well calculated Dataset and well dimensioned, downloadable from reliable sources with guarantee that the necessary files are free of errors.

The first step, after the delimitation of the area chosen for the creation of the scenario is to get the necessary files with the extension *. xes (land classification), free at the website X-Plane Developer, also the SRTM files, in the form of HGT, or extension GeoTif, which you can download free from various websites of satellite data from the Internet, which will be listed later in this document. In addition to the formats listed in this paragraph are required *.shp format file (shapefile) that will control and delimit the coastline, the bodies of water like oceans, rivers, lakes, roads, kind of vegetation etc.

What the DFSbuilder does not

- Does not increase or decrease with precision terrain mesh resolutions. The resolution is achieved in external program. (Later in this tutorial there is a good example)
- Does not provide files XES, HGT or SHP to the user. Only indicates where to get them.
- Does not create airport areas flattens or any other area flatten on the scenery. Shows in a tutorial an option how to make.
- does not compile photo realistic scenarios.

Technical Requirements

- Original copy of X-Plane 10 or 11
- Windows 7 or later version installed
- Computer with at least 8 GB of RAM and processor i5

Knowledge of user requirements

- Know how to use the tools available for X-Plane SDK;
- Basic knowledge of creating files and directories in Windows;
- Know edit in Notepad;
- Assemble correctly the database where the DSFbuilder will read the HGT files, XES and SHP edited files.
- Understanding of digital terrain model and extracting the same data from websites download managers of satellite data.
- Know the organizational structure of the X-Plane and the priority of how they work.
- Know how Meshtool work.

Important notice

The developer does not support questions of basic knowledge of Windows, knowledge of the Meshtool, X-Plane 11 or 10 Software Development Kit (SDK) and knowledge of satellite data acquisition required to build the mesh terrain. **If you do not fit within these knowledge requirements, we advise you not to buy the DSFbuilder**, or otherwise look before reading about these essential requirements of knowledge in website. If the user has no knowledge is required he visit the development of X-Plane to obtain knowledge essential. https://developer.x-plane.com/ .

Acquisition of DSFbuilder

You can buy the DSFBUILDER in two versions: home user(U$ 27.00) and commercial user (U$ 145.00), on the website www.x-plane.com.br/dsfbuilder.

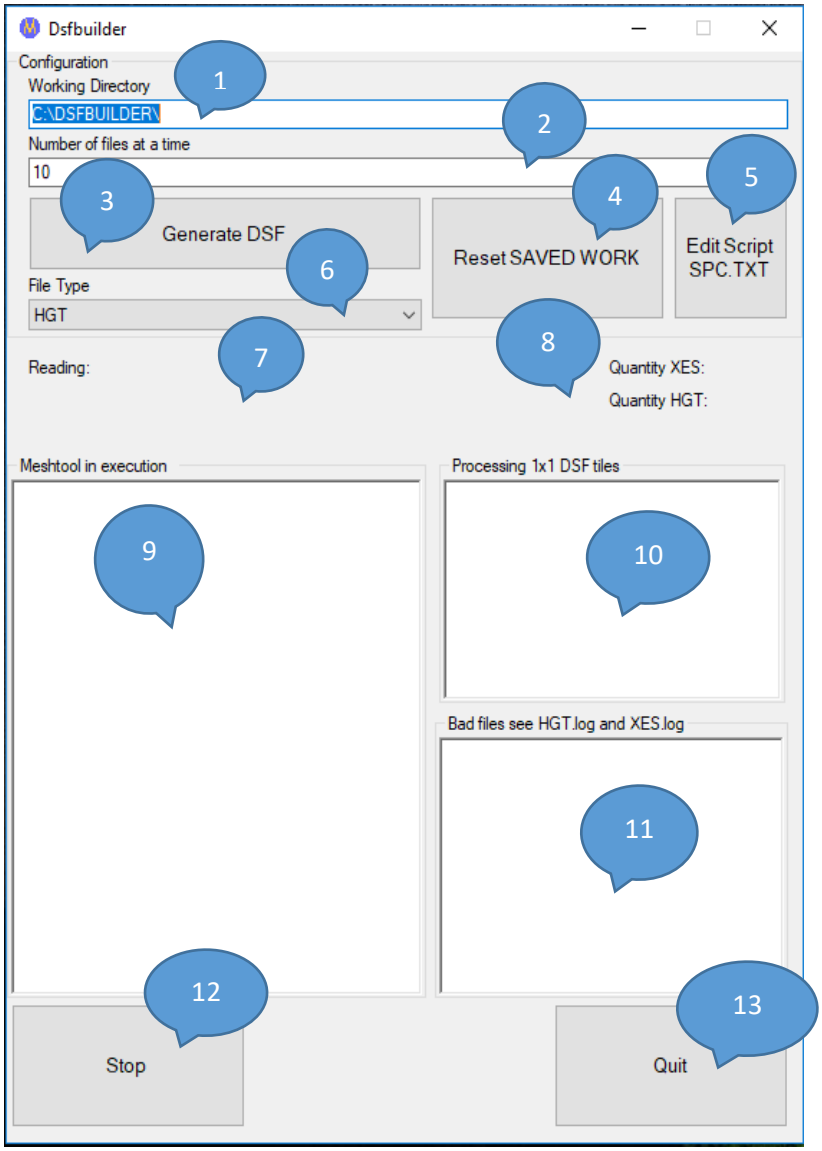
Both versions have the same functions, differing only in the price and use.

After purchasing the user will receive a small file to run on the computer where is installed the DSFbuilder. This file will generate an installation code. It is necessary to send to the developer the alphanumeric information. The developer will return to the customer the executable customized for the user.

After receiving the DSFbuilder for download, do it and run by clicking on the icon with the letter M. It will open the following interface.

Interface

Understanding the simple DSFbuilder interface



1) Is a resident of the DSFbuilder Directory (cannot be modified)

2) Number of files compiled by time (maximum 10). We recommend a maximum of 100 files in the Dataset each time to a PC with 8 MB RAM and processor i5. The more RAM and more powerful processor, more files can be allocated in the Dataset.

3) Generates DSF files

4) Resets the SAVED_WORK folder where the user can copy the final files in the existing folders in Global Scenery of X-Plane 10 or 11.

5) Allow user to access the SCP.txt to be edited according to the needs of each project.

6) Option to use TIF format or HGT in the Dataset.

7) DSFbuilder message Field

8) Indicators of the quantity of the files used in the project. Both, XES and HGT formats, must to have the same amount before giving the command to generate.

9) Window where is seen the Meshtool compiling in real time.

10) Window showing which HGT or TIF files are being processed.

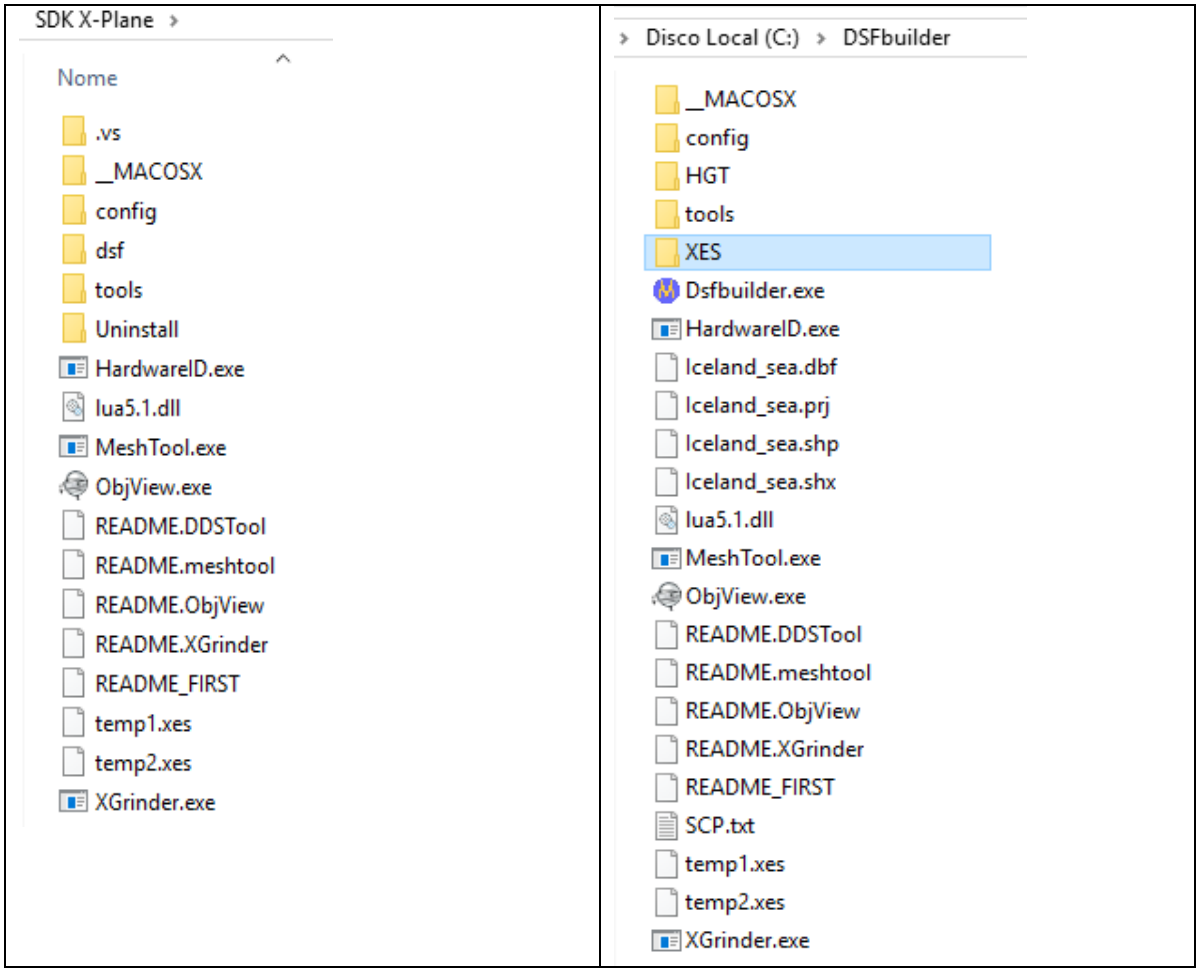
11) Window that shows the HGT files or TIF that contain errors. Fits the user have knowledge to fix them. (Later in this manual will be shown where to get necessary tools.)

12) Stop DSFbuilder process.

13) Quit DSFbuilder.

Meshtool structure with DSFbuilder integrated.

Below in the first table the Meshtool original structure and in the second table initial integrated DSFbuilder structure after installation.



TUTORIAL 1

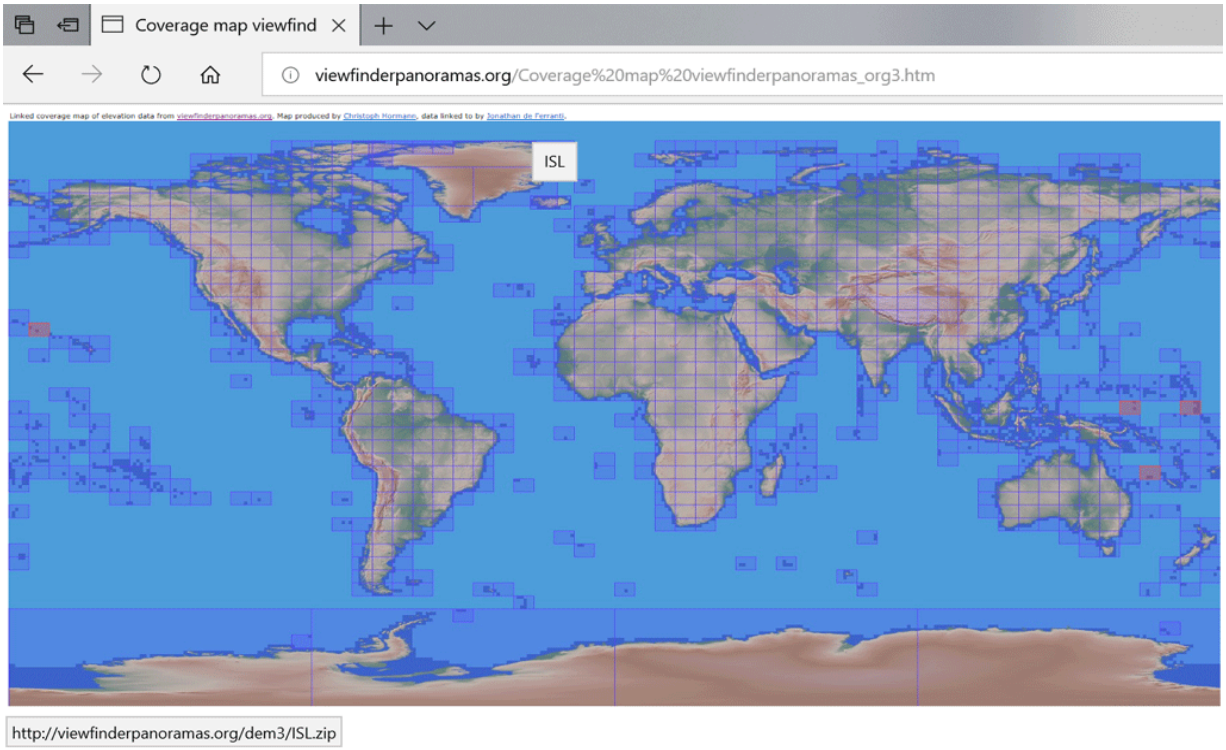
Automating tasks with DSFbuilder

Step 1 – satellite data acquisition

Choose the Mesh scenery area to be built. It is very important that the user put a secure database free of errors at the source so that the process is not interrupted by DSFbuilder. If the file contains error (corrupted), the error message will appear in the appropriate field (10). He must be fixed and compiled separately to avoid recompile all files in dataset.

Download the database there can be done from several suppliers of DEM (Digital Elevation Model), in various formats. In this example we will use the more common, the HGT format, which can be downloaded for free at the link below. This SRTM formats provider *.hgt offers medium resolution files, rarelly occurring incidence of errors in relief. This provider lets you download all files at once and already provides HGT format files for use in DSFbuilder. No conversion is necessary.

http://viewfinderpanoramas.org/Coverage%20map%20viewfinderpanoramas_org3.htm



The **USGS LP DAAC**, supplier of files to generate the mesh, accessed at the URL https://gdex.cr.usgs.gov/gdex/ , has the latest update ASTER DEM V2 Global, with reliefs in resolutions a lot better and with less errors to be corrected. It's a very interactive interface, easy to use, with the only drawback to free to download 20 tiles of 1 x 1 degree at a time. But, the user can do this as many times as you want until you get the files needed to complete the scenario. For now we will use data from the map above.

Mesh of Iceland

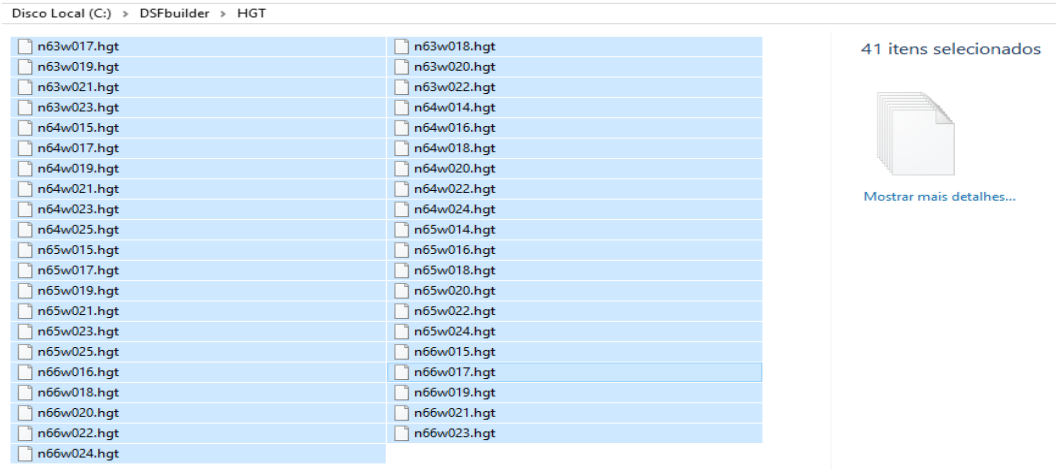
Choose for this tutorial to build the Mesh of Iceland, which has 41 tiles HGT and 41 tiles XES. These tiles have inserted in DSFbuilder Setup, just as the Dataset example to build, the user must remove these files before build your own mesh terrain.

This tutorial considers that downloaded the files from Viewfinderpanoramas

http://viewfinderpanoramas.org/Coverage%20map%20viewfinderpanoramas_org3.htm

The first installation of the DSFbuilder already brings the tiles of the area of Iceland with the *.hgt corrected, remembering that it is only the Mesh Terrain original without flattening areas and no correction (fine tuning) in the areas of airports.

Below the structure within the HGT directory in DSFbuilder.



Download files Land Class files concerning the coordinates of the HGT files. For files of Iceland have to download the XES folders.

+ 60-020.zip

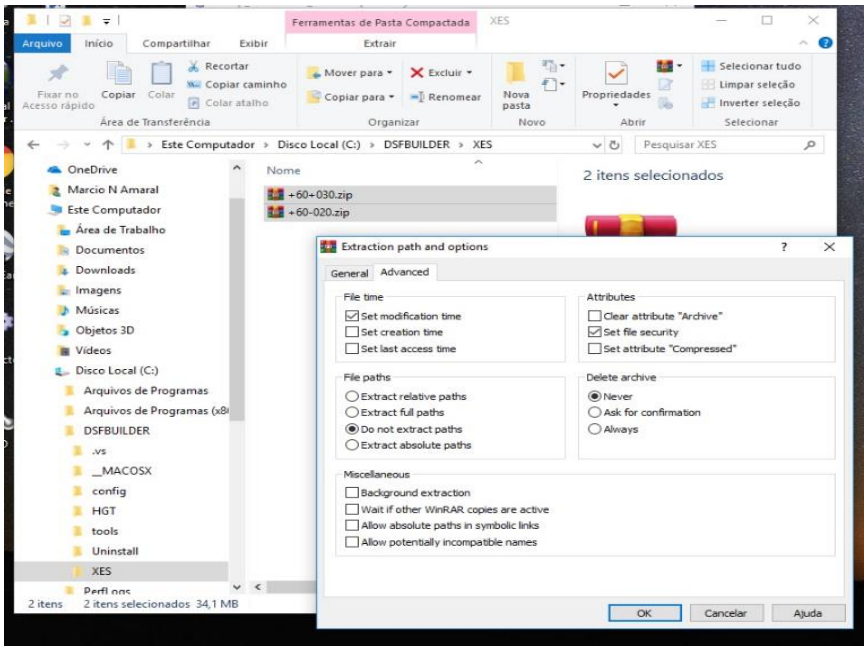
+60-030.zip

This operation is free of charge from the website:

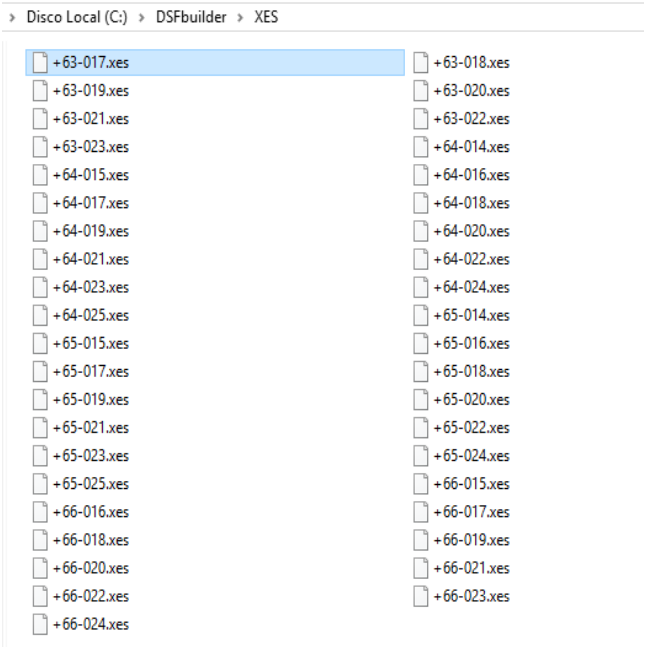
http://dev.x-plane.com/update/misc/MeshTool3/

Step 2-data decompression and DataSet construction

Unpack them in the XES directory located in the root of the DSFbuilder. Attention to decompress and be careful not to create subfolders within the directory XES. For it is recommended to use the program WinRar (free, select the downloaded *.xes file and in the Advanced menu choose option "Do not extract paths".



The XES folder in DSFbuilder root.



Gathered their *.hgt and *.xes files, copy them to their respective folders HGT and XES in DSFbuilder root.

Remembering the parity of the files, 41 in the format *.hgt and 41 in the format *.xes

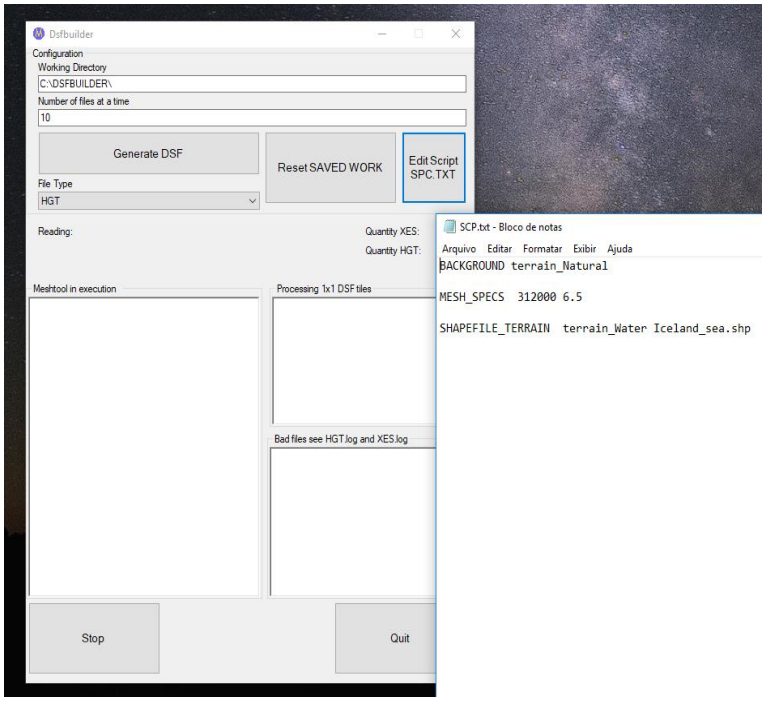
Step 3-using the DSFbuilder

Open the **DSFbuilder.exe** program by clicking on the desktop shortcut.

Check by the Quantity indication if the files are same me number, both *. XES and *. HGT. Must to have equal numbers and be relative about coordinates. Otherwise the DSFbuilder not work.

Edit the SCP.txt necessary for definition of the script for the Meshtool run. If the user has difficulty editing Scripts, access the online manual at https://developer.x-plane.com/manuals/meshtool/ .

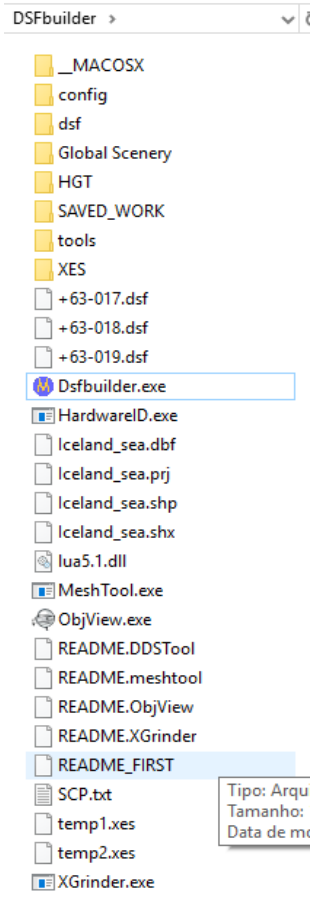
Click the Edit button on the interface Script to populate the parameters that your scenario requires and save.



Choose which interface digital terrain model format that is in use, *.hgt or *.tif

Generate the DSF files

After clicking the Generate DSF command, DFSbuilder will automatically create the following folders below the DSFbuilder.exe and HardwareID.exe executable files in the root. DSFbuilder will also generate all DSF files at their roots while copying the valids to the SAVED_WORK folder. In the next Generate DSF command, all dsf files in the root will be automatically redefined. In order for the DFSbuilder to be validated, the user must first execute HardwareID.exe, which will generate code that must be sent to the developer to generate a license.



DSF

Original of the Meshtool in archiving border.txt required. DSFbuilder will generate it when started for the first time.

GLOBAL SCENERY
Folder containing the original structure of the X-Plane 10 and 11 with the *.dsf files in their respective folders. This folder will be reset whenever the user starts a new job.

HGT
Folder where the user will keep your *.hgt or *.tif files

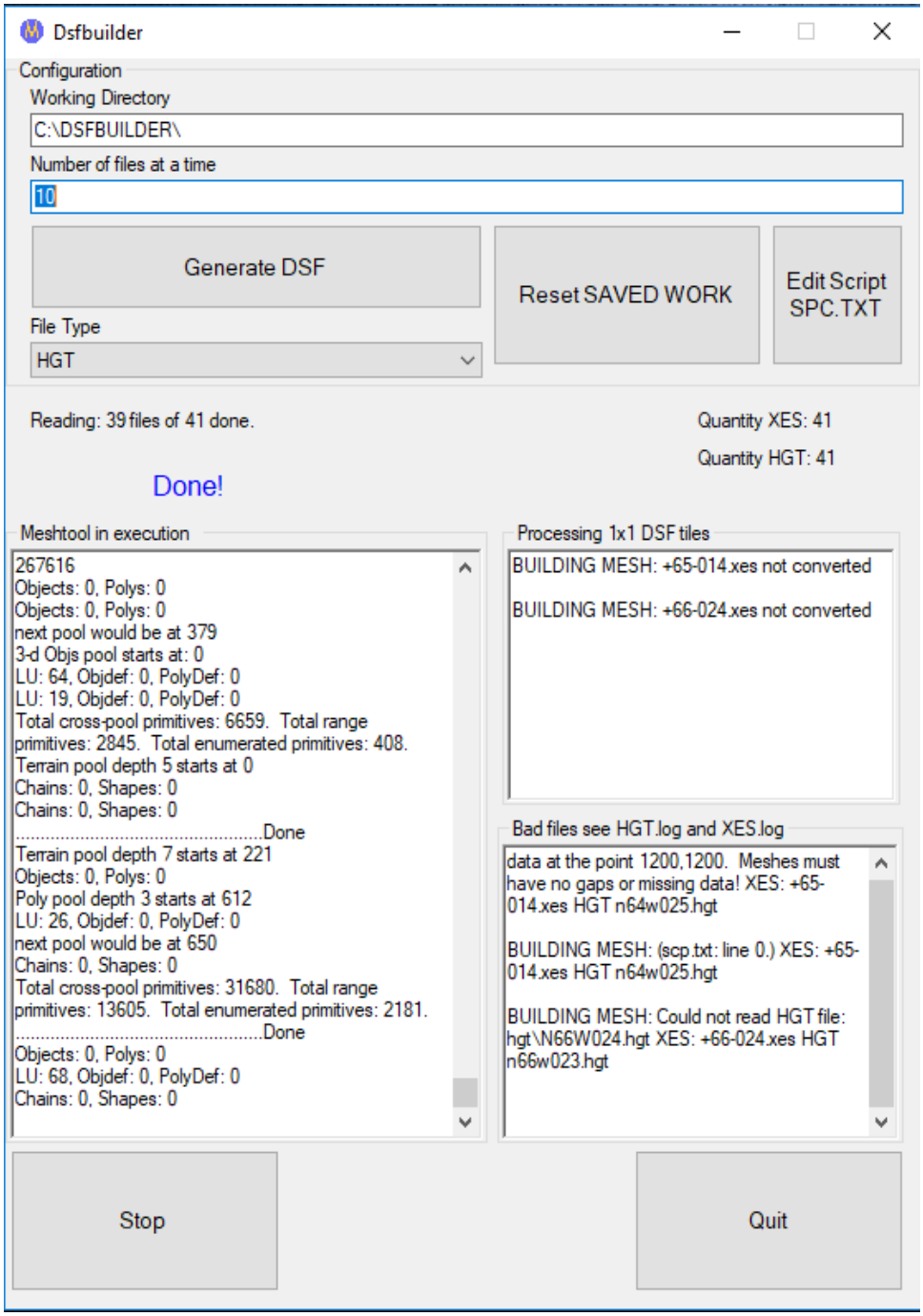
SAVED_WORK
Folder where will be written the same files from the DSFbuilder\Global Scenery that will be reset on DSFbuilder interface to the user command. She will keep all the work generated by the user, so accumulated in the structure of the X-Plane X-Plane 10 and 11. This folder will never be reset automatically.

BAD_HGT_XES
Folder where the HGT corrupted files will be copied

XES
Folder where will be held the files *.xes

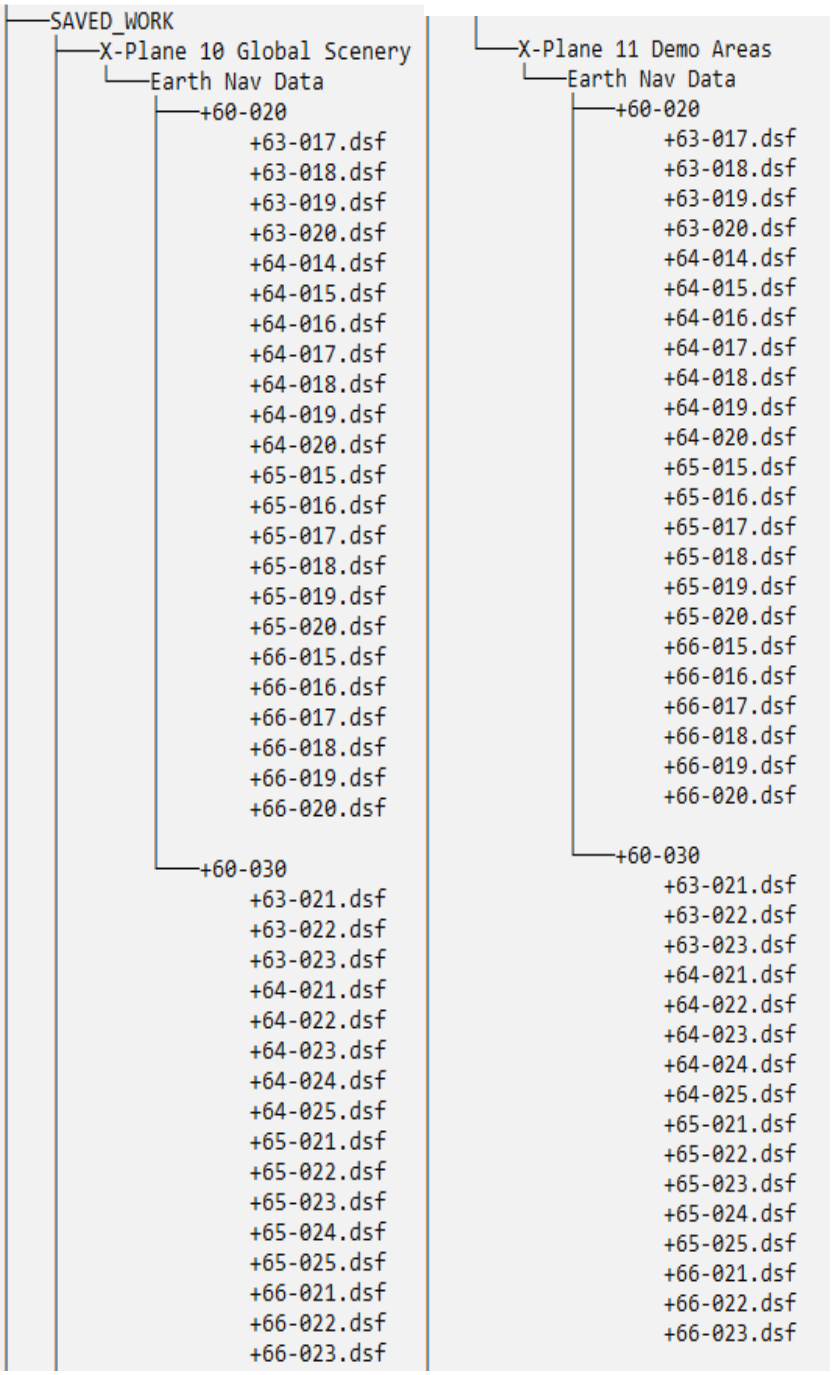
After the end of the process the DSFbuilder shows which HGT files have errors at the source and that need to be fixed using specific programs for correctness and submitted individually to the new generation process. We recommend the GlobalMapper, which is commercial, however there are other free programs that can be downloaded from the Internet.

Below the interface after compilation showing two *.hgt files with errors. These will not be raised their respective *. dfs.



Occurring that, after having fixed the HGT files, or downloaded other different source and that are healthy, the user has the option to perform all build again, or to save time delete all the files contained in the directories XES and HGT and copy for them only those who need to be recompiled. To restart the process, the DSFbuilder will do a reset in all its proprietary aggregate folders to the root of the Meshtool, except the SAVED_WORK folder that stores a backup of all valid *.dsf files ready to be copied to the X-Plane 10 or 11;

The DSFbuilder generates files for the X-Plane 10 and 11 at the same time. Below the SAVED_WORK folder after the end of the generated process.



DSFbuilder manual ends here.

Attention: We recommend that user not use any programs while DSFbuilder is running. Unless the user instructs DSFbuilder to run fewer files simultaneously or if has a PC configured with high processing power.

The next section, **RETRIEVING HGT FILES**, shows one of the ways to fix HGT files and the way to fix the terrain elevations, in addition to the flattening of the relief areas at airports.
After your work, copy the compiled the directories contained in the directory SAVED_WORK to X-Plan

RETRIEVING HGT FILES

One of the more complex tasks in the construction of airports that need detailing and flattening of the relief in the areas of airports is the handling of the mesh, primarily by the fact that the satellite readings always present discrepancies and errors in the surfaces. The option in the WED editor solves part of the problem, however it creates a very flattened area and differs a lot from reality. In regions near rivers, lakes and oceans, especially near the banks, this option in the WED causes discrepancies in the relief that advances on the aquatic masses forming undesirable steps of water.

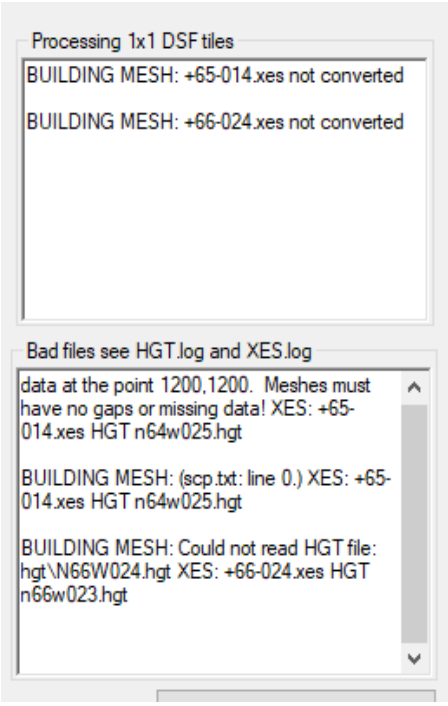
Requirements for correction of a DEM, HGT or TIF

- Files with errors or need detailing and flattening in areas specified by the user.
- Program satellite data handling. There are several free, but not as efficient as a commercial application as the Global Mapper. The user can download it for free to try out the results by following this step by step.

Correcting flaws in HGT files (filling gaps)

When the user uses the meshtool compiling manually on the command line and at the end of the process shows the error message saying that the HGT or any other DEM compatible errors there will be porting the need to fix them. Such errors are referred to as "gaps", which are presented in the original construction flaws in the file. For better understanding, below we will fix an error file.
Were inserted in the folder *.hgt files to be 41 HGT compiled at once, however the DSFbuilder shown in the window of mistakes two of them that not compiled. The DSFbuilder compiled 39 of 41 discarding the twos containing flaws and showing in windows error.

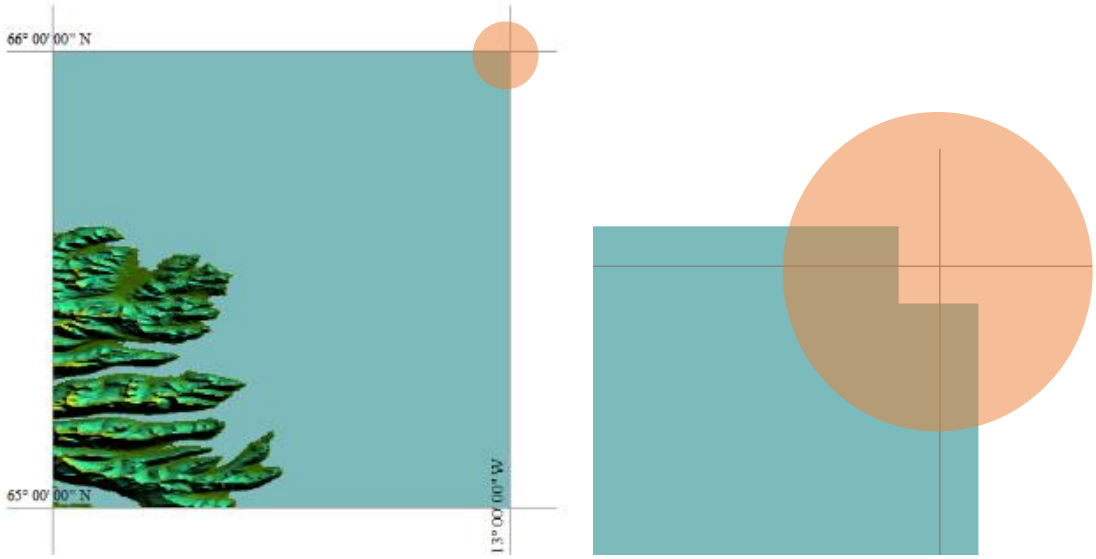
N64W025.hgt and N66W024.hgt (the files *. XES must be ignored)
At the root of the DSFbuilder HGT.log file is generated listing such errors or annotate the shown in appropriate DSFbuilder window.



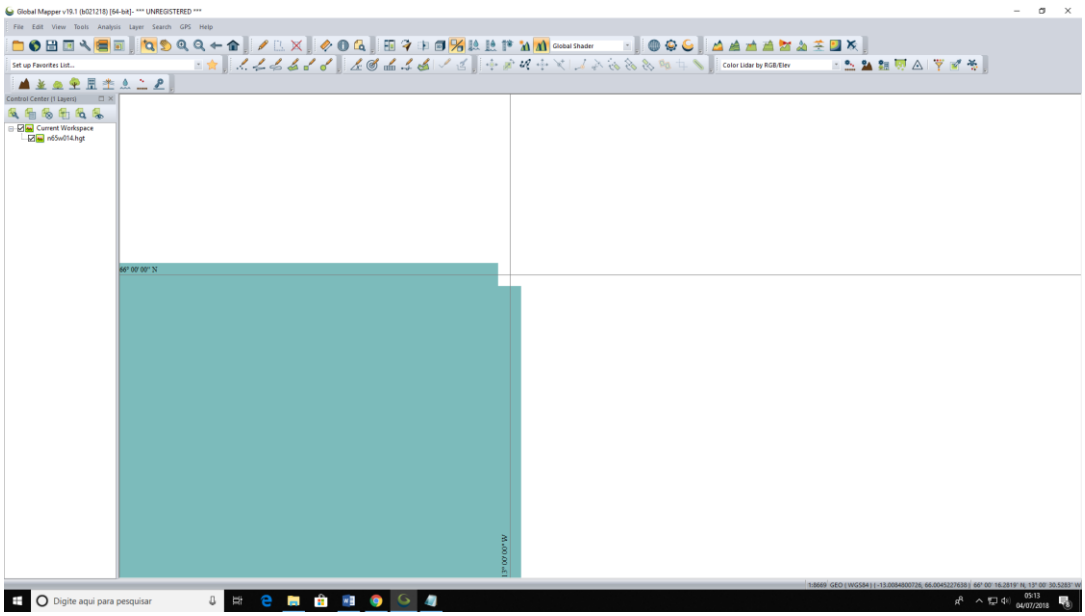
Global Mapper is the tool we will used to correct the error files. The Global Mapper allows you to use for free for a certain period in trial version.

Open the *.hgt file with error in Global Mapper. Apparently doesn't show any errors, however, if we examine with some detail, applying zoom in, on the far right above there will be a small overlap failure,

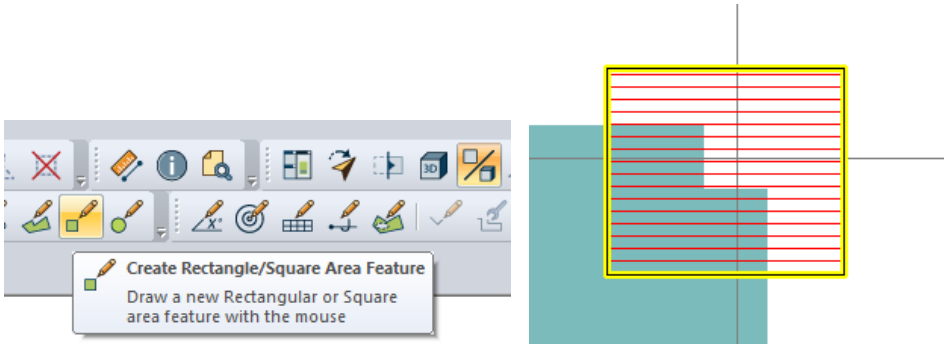
a gap that needs to be filled. The error usually occurs in areas of the corners and that contains mainly surfaces with water masses.
Below the file N65W014.hgt and right one in detail.



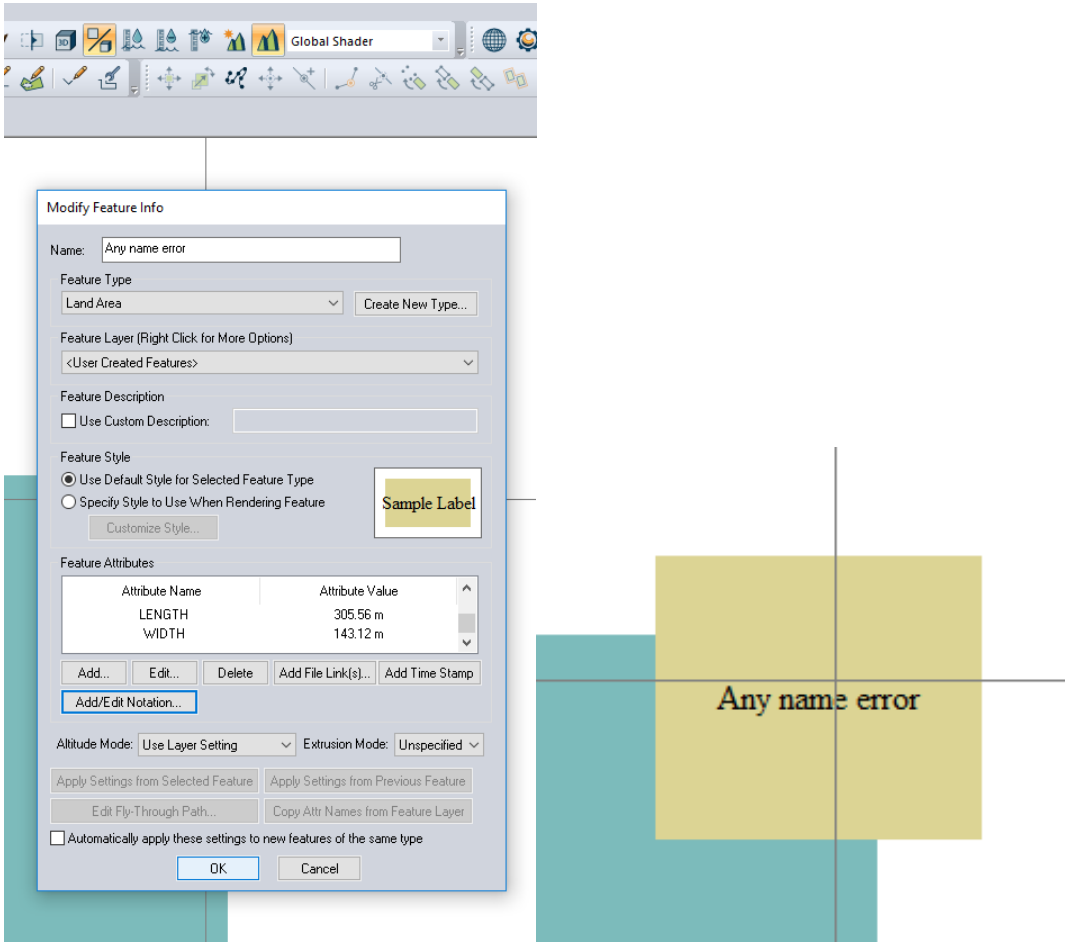
Approaching the GlobalMapper



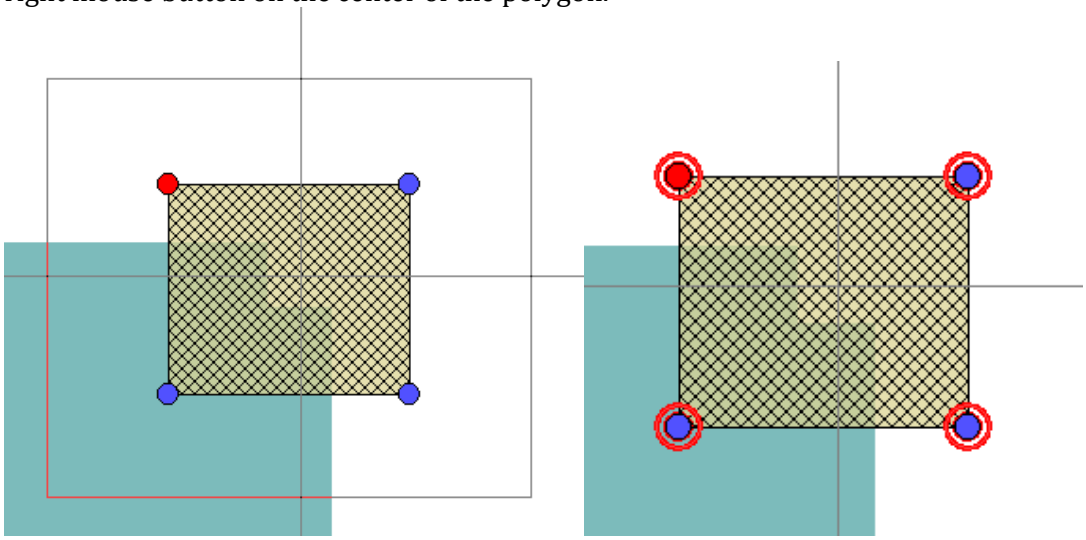
Use the authoring tool to the area by dragging the mouse to cover the area of the fault with a rectangle.



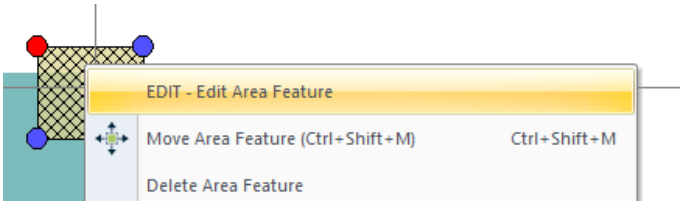
When you drag the mouse and create the rectangle with any name and specify the preset LAND AREA, click OK. On the Global Mapper will arise the filled rectangle with the specified name.



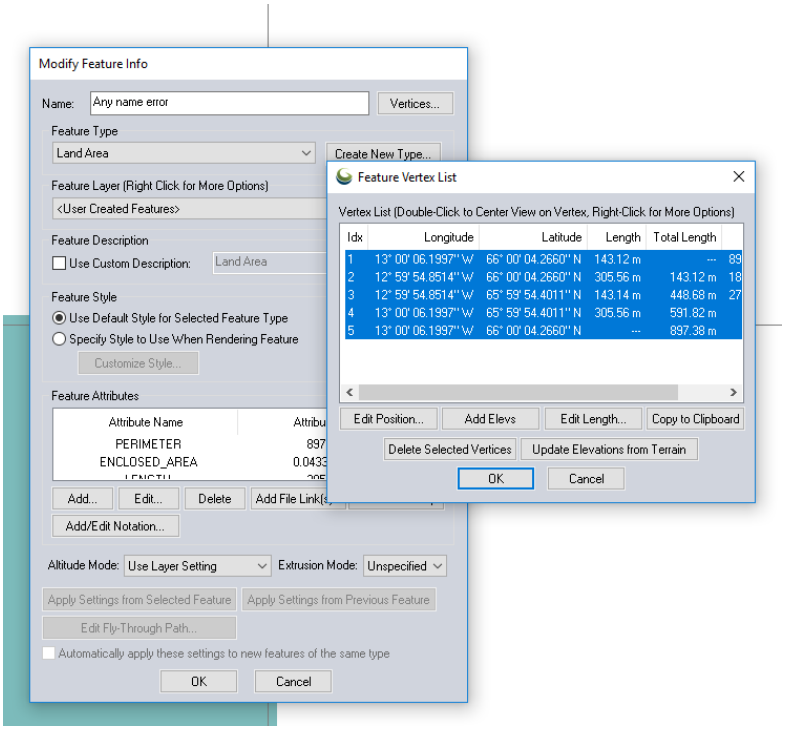
Choose the pencil tool for editing the altitude. Is necessary to transform this rectangle polygon in Mesh.
Choosing the menu and clicking on the pencil he's going to show selected polygon. Dragging the mouse over it with the left button pressed, select the four corners of the polygon. Following click with the right mouse button on the center of the polygon.



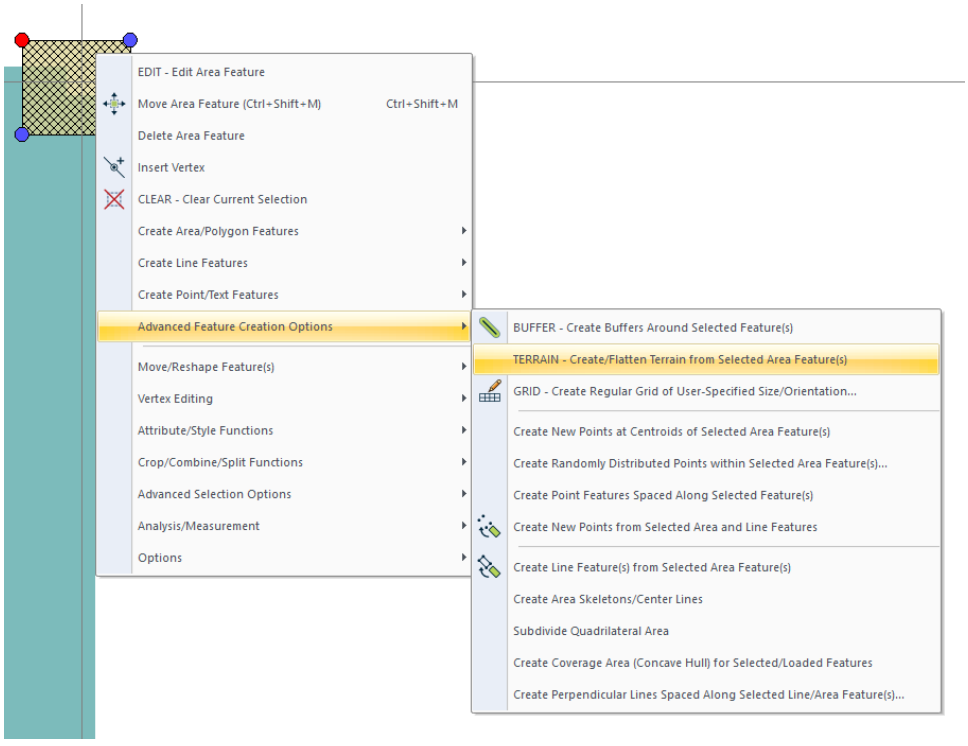
Dialog box will appear and choose EDIT AREA FEATURE



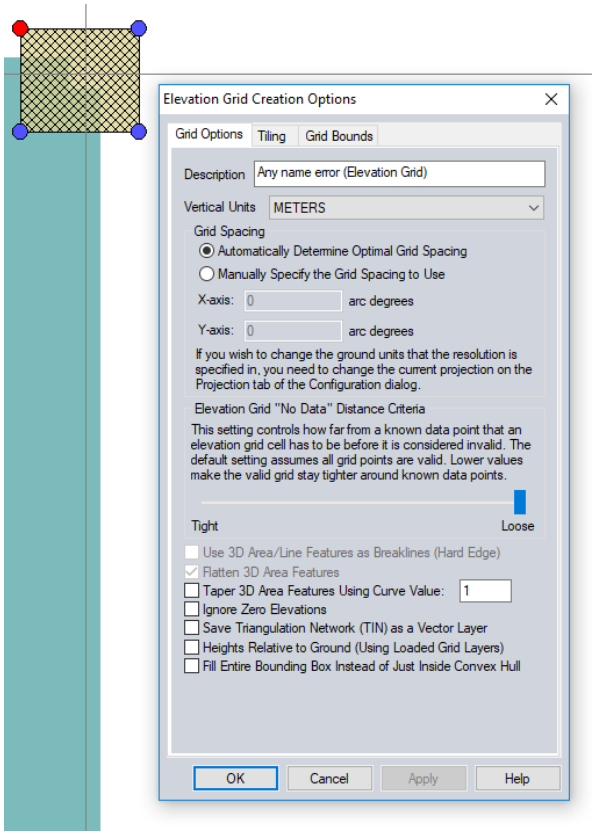
Going to pop up the dialog. Click on Line Vertices, select all points and click on ADD ELEVATION and set ALTITUDE 0 (zero) in the field, and click OK. The rectangle will be ready to be transformed for polygon mesh.



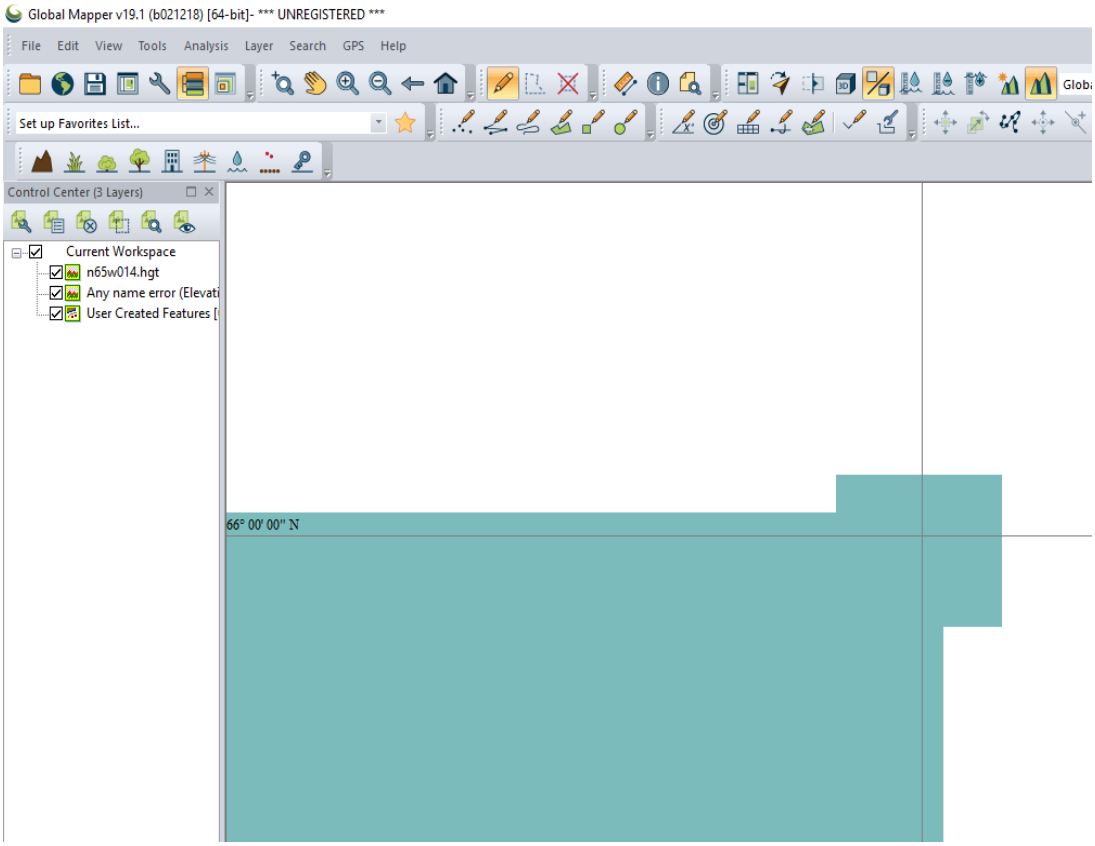
Click again with the mouse in the polygon, always with the PENCIL tool, and then choose the options shown below. ADVANCED FEATURE CREATION OPTIONS and window open in TERRAIN-CREATE FLATTEN TERRAIN FROM SELECTED AREA FEATURES.



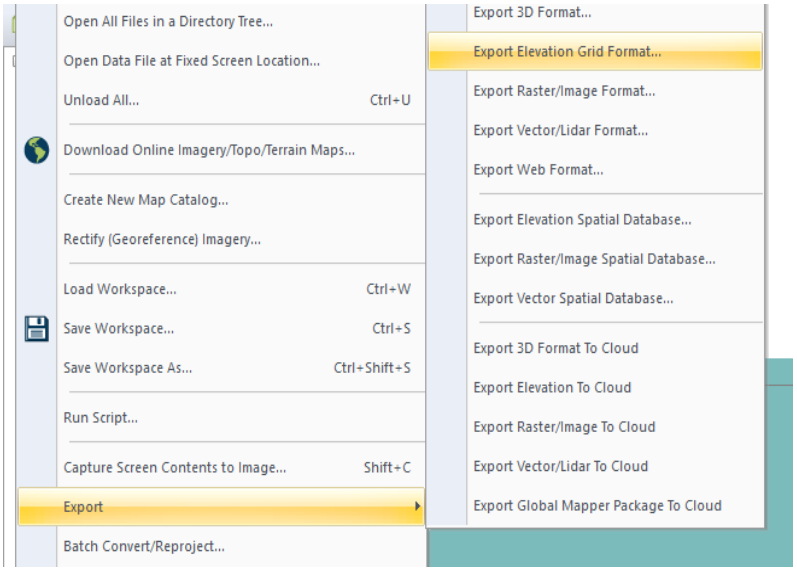
Will appear a dialog box with the specifications. For altitude 0 (zero), leave the options X-axis and y-axis to 0 (zero). In the case of applying the same rule in polygons with more points in areas of airports that need to be flattened, the X-axis and y-axis should be with the option Manually in both 0.00001 fields for the Global Mapper create a mesh of very high resolution in HGT and may be up to centimeters.
But, in this case to just fill the error, leave the default (AUTOMATICALLY) and click on OK.



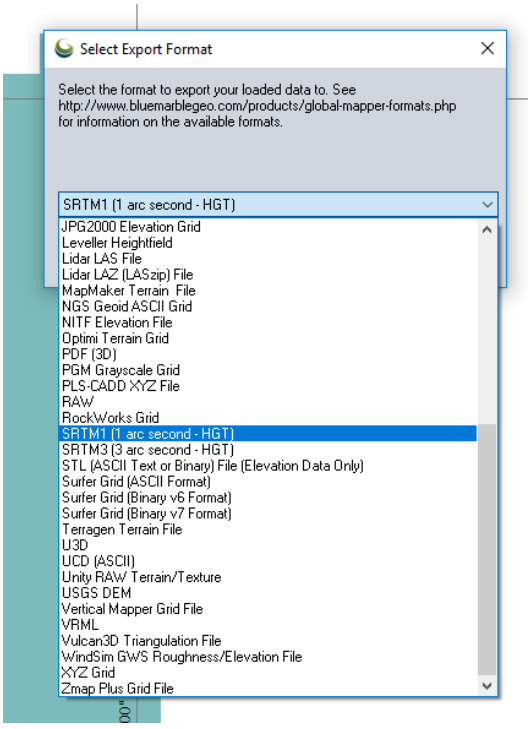
Deleting the polygon that is no longer needed the result is the error in the HGT as shown in figure below.



The next step is to export by choosing EXPORT ELEVATION GRID FORMAT



Choose the type of file you want to export, in the case of HGT format, choose SRTM1 or STRM3



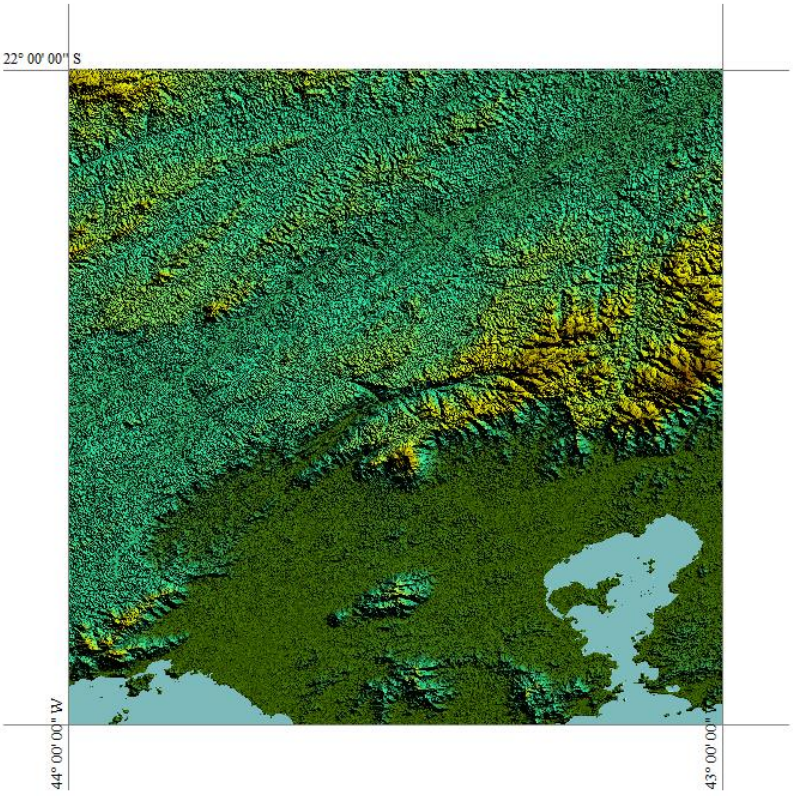
The program will generate a new file N64W025.hgt without error.

Done this procedure in the archives with error, submit them to DSFbuilder to generate the + 65-014.dsf on the N65W014.hgt, which will be aggregated with the correct files into the SAVED_work folder.

FLATTENING THE TERRAIN WITH THE GLOBAL MAPPER

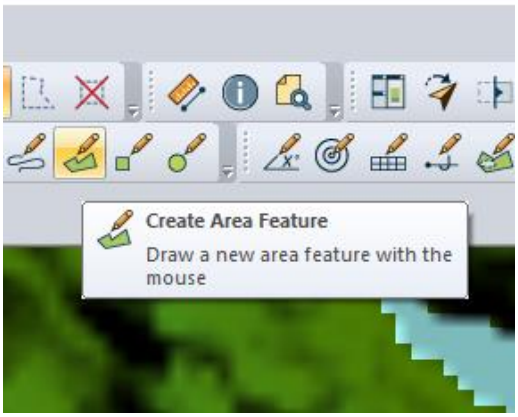
It is common when you see the X-Plane many discrepancies, mostly along some leads that makes it impossible to perform takeoffs and landings. To solve you need to adjust the altitude of the area of the airport. Let's use as an example a critical area is the SBRJ Santos Dumont Airport in Rio de Janeiro, where geography shows severe altitude errors in DEM files.

A good source of files with better resolution has already been cited at the beginning of this document. Visit the link https://gdex.cr.usgs.gov/gdex/, do your register to be able to download for free a series of satellite data with good resolution. Enclose the area and find the Tile that you want. In the case of Rio de Janeiro is S23W044, that after downloading the site mentioned above comes in **ASTGTM2_S23W044_dem.tif** format, which must be loaded into Global Mapper. You can download only one or the amount of tile 1 x 1 desired.

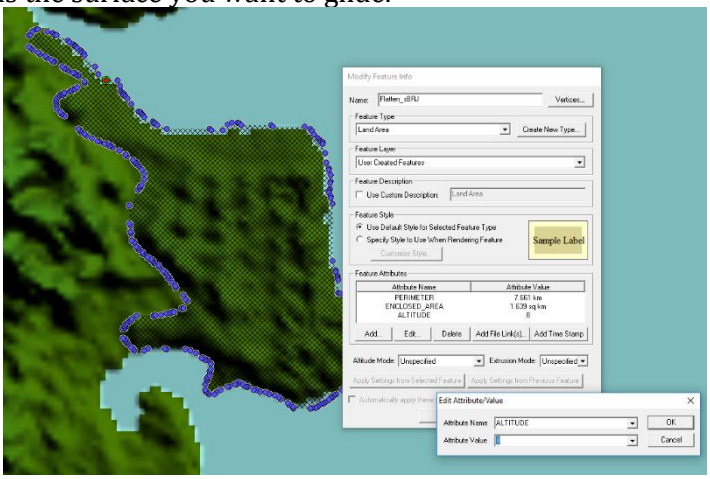



S23W044.hgt

Choose the CREATE tool AREA FEATURE for irregular polygons.

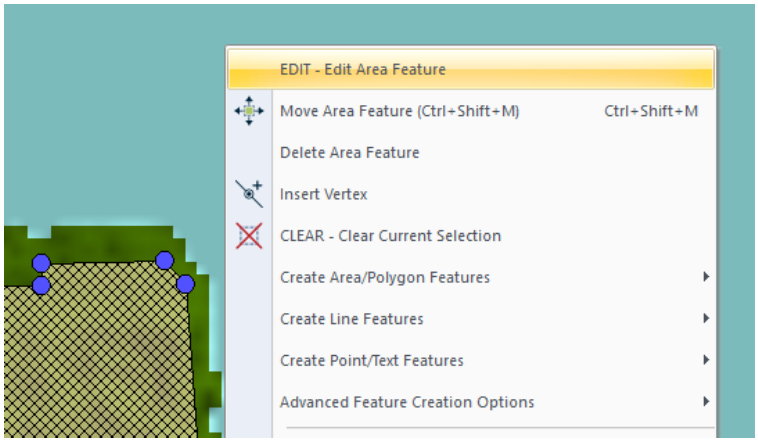


Enclose the desired area, and may contain multiple vertices with any amount of points, noting that the higher resolution greater processing capacity must be your PC. After closing the polygon dialog box appears. Select all bertices in the polygon, click the button ADD and in the dialog box, select 8 meters above sea level, which is the surface you want to glide.

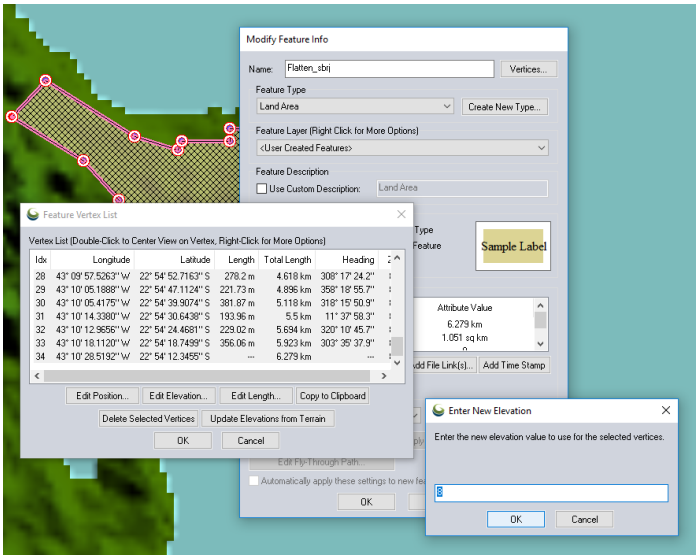


Following with the left mouse button pressed drag diagonally and select all vertices.

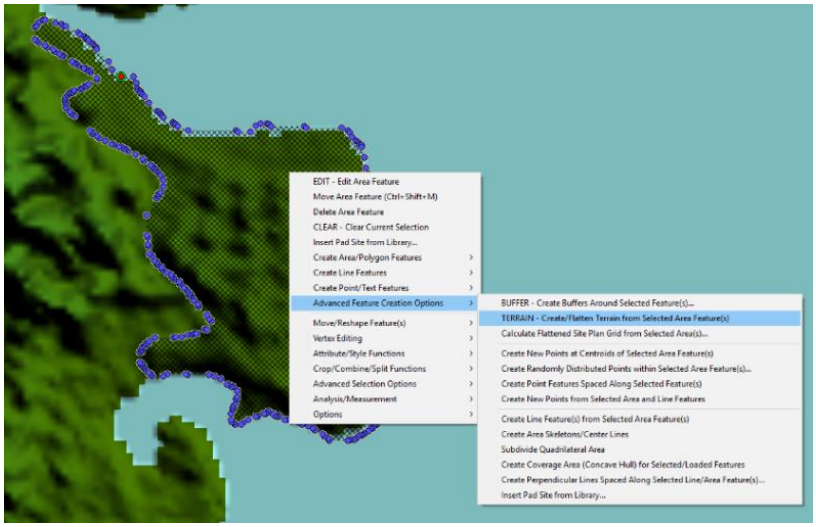
Click with the right mouse button on the selected polygon with the all selected vertices.



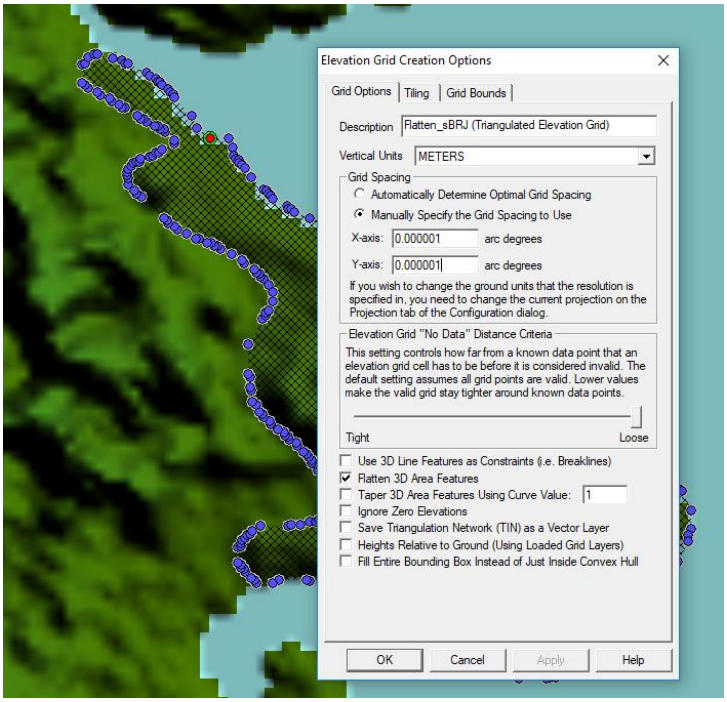
Click EDIT AREA FEATURE and the dialog box below. Click VERTICES, the second dialog box, select all the lines of the vertexes and click EDIT ELAVATION, appearing the third dialog box. If you don't show up the first time, try EDIT ELEVATION again until she arise (bug of the program Global Mapper) following will pop up box with the height of 8 meters, and then click OK.



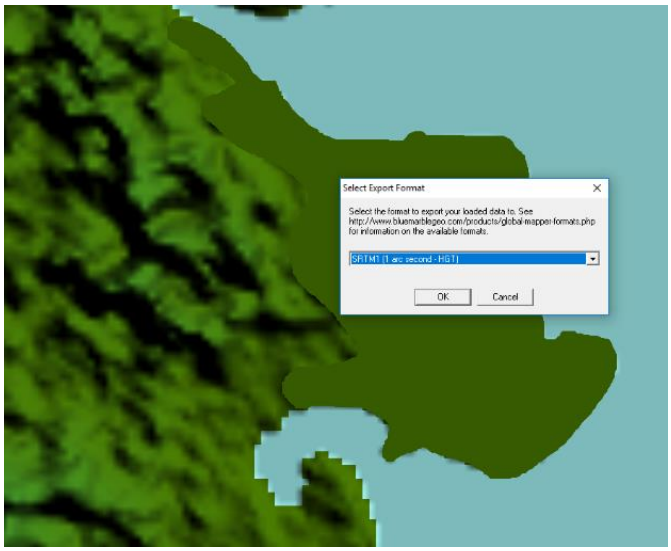
Then click with right mouse button on the image and choose the options below and click on the two options below to create open the flatten resolution setting.



The dialog box where you increase the spacing of points to define the resolution of the Mesh. The Default is 0.0 select the manual option. In the table below the polygon to generate the area flatten received a mesh of points with the resolution of X = 0.000001 X Y = 0.000001. Press OK to generate the DEM Flatten.

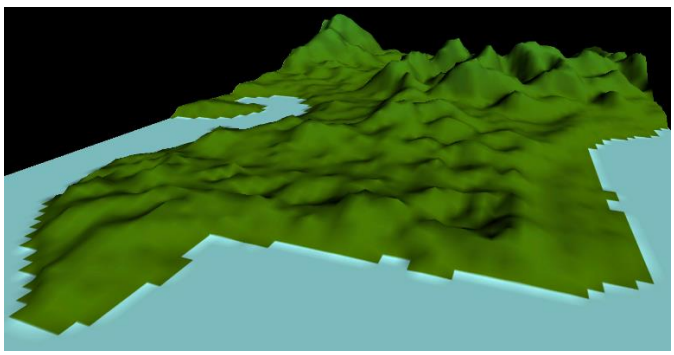


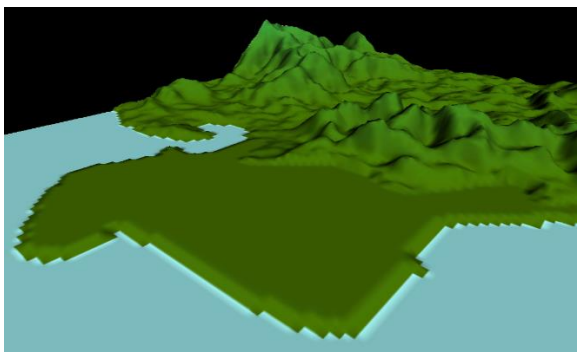
Delete the polygon area and flatten the user created on the file *.hgt. Following, export the GRID elevation SRTM 1 or 3 and this is the result of the figure below. A completely flat surface with very high resolution of the mesh, 1 meter or centimeters if necessary.



After download all data from the Global Mapper and upload your new tile S23W044.hgt created, that will show in the result the area flatten.

Below, detail of the *.hgt file before and after the Flatten.





The next step is to copy the new S23W044.hgt to the folder DSFbuilder, check the HGT the corresponding LANDCLASS your -23-044.xes is inside the folder XES, also at the root of DSFbuilder. Following press GENERATE DSF in DSFbuilder. A new file -23-044.dsf in the folder SAVED_WORK.

Copy to the X-Plane and test. It is the responsibility of the user to observe the result in practice, performing procedures for takeoff and landing. It is common to achieve flatten adjustment several times until we get the desired result. Be patient.

Free GIS programs

Tested and use only the Global Mapper. It is the responsibility of the user to search on the free alternatives

https://alternativeto.net/software/global-mapper/?license=free

Free Data Satellite

https://www2.jpl.nasa.gov/srtm/

HSimulators FS Company

www.x-plane.com.br

hsimulators@x-plane.com.br

Support: www.x-plane.com.br/support

From Monday to Friday – 9:00am to 5:00pm -03:00 GMT