

# Portugal Terrain

## Manual



1. Introduction and Information .....	3
2. Portugal Terrain Scenery.....	5
2.1. Mesh Scenery .....	6
2.2. Water Scenery .....	8
2.3. Land Class Scenery .....	12
2.4. Roads and Railroads.....	15
2.5. Photographic Scenery .....	17
2.6. Location of Aerodromes and Objects .....	19
3. Installation .....	20
4. Changes made by SETUP .....	26
5. Compatibility with other sceneries .....	31
6. A Challenge.....	33
7. Acknowledgements .....	36

## 1. Introduction and Information

Portugal Terrain is landscape scenery that covers the whole territory of continental Portugal. Portugal Terrain spans an area that goes from approximately N37° 57' to N42° 10', in latitude, and from W09° 32' to W06° 10' in longitude.

You can get a full size map of Portugal in the scale 1:500.000, similar to the one shown in this page, from IGeoE – Instituto Geográfico do Exército. The link to download the map is shown in reference [1]. The map is a huge JPEG file with a size of 21 MB file and has a resolution of 250 dpi (dots per inch). Smaller versions of this map in resolutions of 150 100 and 72 dpi can be obtained from the same site from the page [2]. You can also visit IGeoE-SIG – an invaluable online service about maps and Portugal.

Another free map (10 MB JPEG file) in the scale of 1:500.000 available through the Internet [3] can be obtained from IGEO – Instituto Geográfico Português.



General aeronautical information about

Portuguese airports and aerodromes can be found in [4] and [5]. In both sites you can easily search the runway you are interested in by clicking on maps. However, the information is only presented in the Portuguese language.

Aeronautical charts covering Portugal can be downloaded from the Portuguese branch of VATSIM at [6].

NAV E.P. has the mission to provide air traffic services in the flight information regions (FIR) under Portuguese responsibility. NAV maintains a site, [7], containing information of general technical interest.

INAC -Instituto Nacional de Aviação Civil - is the responsible body for the international diffusion of aeronautical information concerning the entire territory and the airspace of Portugal. INAC has a page [8] with descriptions of relevant national aerodromes used during the Euro2004 football event.

#### References:

- [1] [http://www.igeoe.pt/downloads/500mil/500mil\\_24bits.zip](http://www.igeoe.pt/downloads/500mil/500mil_24bits.zip)
- [2] <http://www.igeoe.pt/downloads/download.asp>
- [3] [http://www.igeo.pt/IGEO/portugues/e-IGEO/DOWNLOADS/500\\_mil/500k.zip](http://www.igeo.pt/IGEO/portugues/e-IGEO/DOWNLOADS/500_mil/500k.zip)
- [4] <http://www.pelicano.com.pt/zmapa.html>
- [5] <http://scrif.igeo.pt/servicos/pistas/>
- [6] <http://portugal-vacc.org/>
- [7] <http://www.nav.pt/ais/>
- [8] [http://www.inac.pt/htm/Serv\\_AerEuro2004.asp](http://www.inac.pt/htm/Serv_AerEuro2004.asp)

## 2. Portugal Terrain Scenery

Portugal Terrain incorporates the following parts:

- Mesh - total coverage of the national territory on a LOD10 resolution (38 meters) based on DTED2 data by IGeoE.
- Land Classes - total coverage of the national territory with textures based on land use maps.
- Photography - coverage of Cascais/Tires and Lagos/Portimão with seasonal textures.
- Waters - total coverage of the national territory from the big international rivers and lakes to the small water streams.
- Roads - total coverage of the national territory with main roads and railways in a density compatible with autogen scenery.

Portugal Terrain scenery can be used as a base for other sceneries and does not contain 3D objects except in very few cases (one is Vasco da Gama Tower in Lisbon designed by Jeff Stanyer and shown in the picture). As we say in our web page: *"With Portugal Terrain you get a chance to make big discoveries! You can start in the north, near Caminha, and follow the Atlantic coast until Vila Real de Santo António. You will see the beaches, the ports, the marinas, the lagoons, the coves, the estuaries, the cliffs and other landscapes that make the Portuguese coast one of the most beautiful ones in Europe"*



In the following pages you will find a description of the content of the scenery.

## 2.1. Mesh Scenery

One of most important features of Portugal Terrain is its digital elevation model system normally referred to as the mesh. The mesh used in Portugal Terrain is based on data by IGeoE- Instituto Geográfico do Exército. This data is a collection of altitude points defined on a grid of 1 second of latitude by 1 second of longitude (DTED2 format). This grid spacing corresponds to 30 meter in the west to east direction by 23 meters in the south to north direction.

Altitude points in FS2004 have a different grid spacing, which depends on the resolution or Level Of Detail (LOD). At the latitude of N40° the spacing between altitude points is shown in the following table:

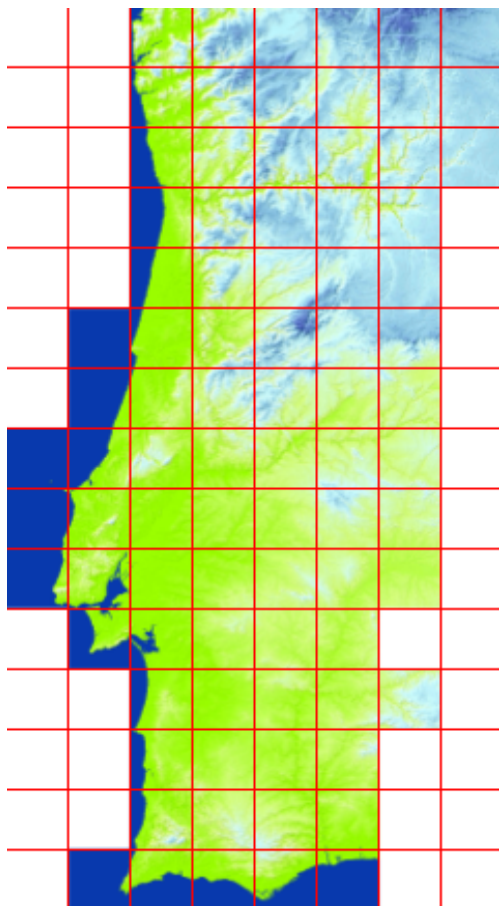
Resolution	East/West	North/South
LOD 5	1250	1220
...	...	...
LOD 8	156	152
LOD 9	78	76
LOD 10	39	38
LOD 11	19	19

LOD5 is the default FS2004 resolution. This means that 2 adjacent altitude points in FS2004 are at distance larger than 1 km. This is not very detailed. On the contrary, Portugal Terrain takes full advantage of the original DTED2 data. The distance between 2 adjacent altitude points is normally 38 meters (LOD10). In 2 regions of Portugal, namely the Berlengas Islands (N39° 25' W9° 30') and Cape São Vicente (N37° 00' W9° 00') Portugal Terrain uses LOD11 resolution, e.g. adjacent points are 19 meters apart.

In order to FS2004 to show meshes of resolution LOD10 or LOD11, the parameter TERRAIN\_MAX\_VERTEX\_LEVEL in the file FS9.CFG should be set to 21. The SETUP scenery install programme sets this so that you should not worry about it.



If you look to the BGL files copied into your system by the SETUP programme (see the install section for more details), you will notice that there are 84 files named DEM08\_CCCRRR.BGL, 84 files named DEM09\_CCCRRR.BGL, 84 files named DEM10\_CCCRRR.BGL and 5 files named DEM11\_CCCRRR.BGL. The letters CCC refer to a column number and the letters RRR refer to a row number (details in a moment). DEM08 refers to a resolution of about 150 meters and DEM09 to 78 meters. FS2004 only shows the detailed DEM10 mesh when you are near the mesh. The 2 lower resolution sets are used when the viewer is far from the mesh. If we had not the DEM08 and DEM09 sets, FS2004 would switch to the standard LOD5 resolution when your distance to the mesh increases.



We finalize this description about the mesh used in Portugal Terrain by explaining the meaning of the numbers CCC and RRR referred to above. In the map shown on the side, you will see a red grid of 8 columns by 15 rows. The total number of squares is 120 ( $=8 \times 15$ ). However some of the 120 squares are in white either because they have a constant altitude of 0 meters (sea level) or they are totally belong to Spain. You can count 84 non-white squares, which are the ones that refer to Portugal. The first row (top row) is row number 136. The last row (bottom row) is row number 150. The first column (left column) is column number 363 and the last column (right column) is column number 370. Rows increase from top to bottom and columns increase from left to right.

This explanation should be enough to understand the naming of the mesh BGL files. For example Lisbon belongs to the 2<sup>nd</sup> column and to 10<sup>th</sup> row. Therefore the BGL file which holds high-resolution altitude data around Lisbon is DEM10\_364145.

## 2.2. Water Scenery

Another impressive feature of Portugal Terrain is the hydrographical representation of the country through the use of “vectorized maps” or VTP/LWM technology. These features comprise the definition of the coastline, the definition of lakes and reservoirs, the definitions of rivers and the definition of beaches and riverbanks. Since Portugal is a country by the sea, this aspect of the scenery could not be overlooked.

In the implementation of Portugal Terrain, a careful editing of the available hydrographical information was carried out to “adjust” the hydro data to the mesh. This means that it is very rare to find, for example, a river climbing a mountain. This is a common problem in many scenery add-ons where inconsistencies between the mesh and the hydro data sets can cause this type of problem. This “adjustment” also means



that water surfaces (sea and lake surfaces) mix naturally with the terrain, forming perfect banks. Also a careful attention was given to the texture assignments of the coastlines. See, for example, Nazaré in this picture. On the right the ground is low and



the beach width is large. On the left, the ground is higher (cliffs) and the beach width is very small.

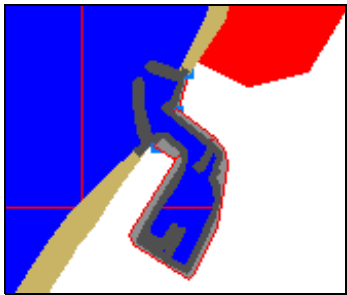
Now we explain the naming conventions used in the hydrographical part of Portugal Terrain as we have done in mesh section. The reason we enter in this detailed discussion is to allow the advanced scenery user to fine tune the utilization of Portugal Terrain with other sceneries (more to come on this subject). Many BGL file names have

Suffix	Meaning
_LWM	Polygons at a fixed altitude. Normally they are water but they can also be flattening polygons without texture.
_VTPL	Lines or stripes that follow the terrain, such as beaches, lake banks and rivers.
_VTPP	Polygons that follow the terrain



suffixes like \_LWM, \_VTPL or \_VTPP. The meaning of these suffixes is given in the above table. Three of the files that refer to water scenery start by the word COSTA (coast in Portuguese). You have COSTA\_LWM, COSTA\_VTPL and COSTA\_VTPP. These files define the whole coastline of Portugal. If you deactivate COSTA\_LWM.BGL by renaming it, for example as COSTA\_LWM.PTS, you will lose the water polygons (blue in the 2 figures in this page) that define the Portuguese Atlantic coast. If you deactivate COSTA\_VTPL you will lose the beaches (yellow in the figures). If you deactivate COSTA\_VTPP you will lose some polygons

defined along the coast as the one in red in the figure (this red means a city texture – actually the figure refers to Nazaré shown in the previous page).

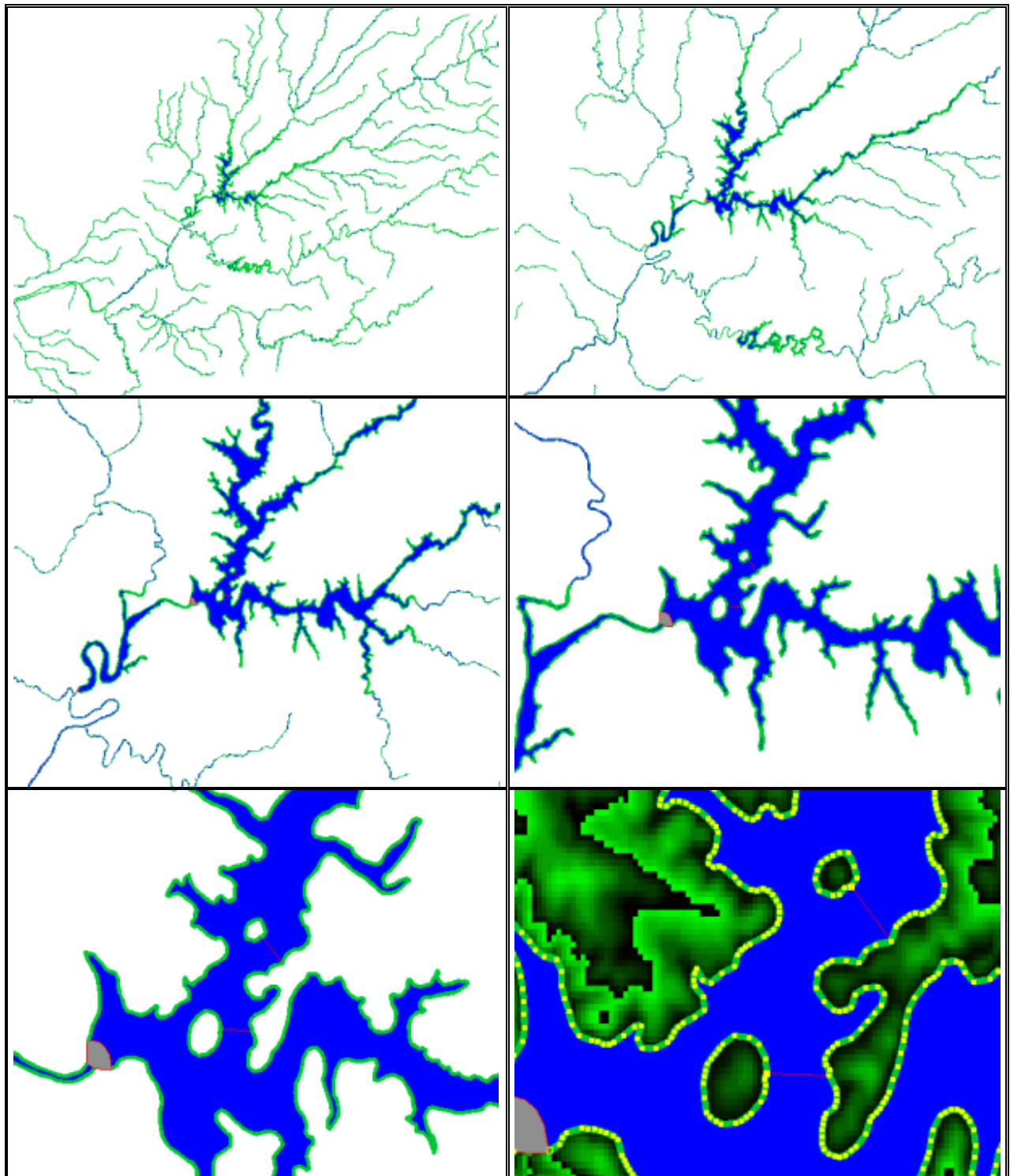


Now that we understand the meaning of the suffixes that are found in the names of the BGL files, let us look to the list of the hydrographical BGL files.

Prefix	Description
MINHO	River Minho and affluent from the left bank
NEIVA	River Neiva and affluent
LIMA	River Lima, affluent and water reservoirs
CAVADO	River Cávado, affluent and water reservoirs
AVE	River Ave, affluent and water reservoirs
RIOSNORTE	Rivers in the north such as Ancora, Leça, etc...
DOURO	River Douro, affluent and water reservoirs
VOUGA	River Vouga, affluent, water reservoirs and “Ria de Aveiro”
MONDEGO	River Mondego, affluent and water reservoirs
LIS	River Lis and affluent
RIOSCENTRO	Rivers in the centre such as Alcobaça, Sizandro, Lizandro, etc...
TEJO	River Tagus, affluent and water reservoirs
SADO	River Sado, affluent and water reservoirs
MIRA	River Mira, affluent and water reservoirs
RIOSALENTEJO	Several Rivers in the Alentejo coast
RIOSALGARVE	Rivers in the Algarve such as Arade, Seco, Torre, etc...
RIASDEFARO	Islands and water channels in Algarve such Formosa, Faro, etc ...
GUADIANA	River Guadiana, affluent and water reservoirs

In the following page we present maps for River Mondego at different scales of resolution. You can check, in the simulator the 2 small islands that appear in “Barragem da Aguieira”. The last picture shows the points that define the water lakes and corresponding banks and how they are well fitted with the mesh (the shades of green represent altitude).

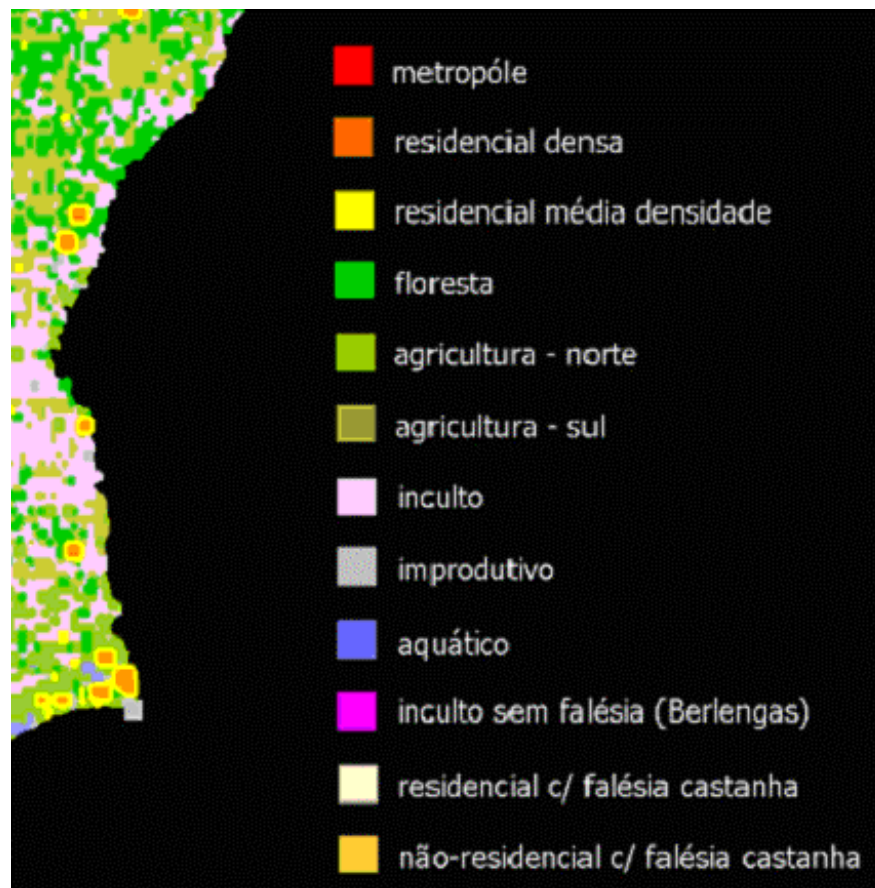
River Mondego – “Barragem da Aguieira”



### 2.3. Land Class Scenery

Land Class Scenery is scenery that uses sets of predefined textures. Each set of textures, or Class, corresponds to a certain type of land use. Flight Simulator defines about one hundred sets of textures. Several sets correspond to metropolitan areas. Other sets correspond to urban and suburban areas. Others correspond to forests. Others correspond to fields and so on.

In Portugal Terrain 12 sets are used. They are shown in the legend of the following picture.



However, Portugal Terrain Land Class scenery has some very unique features. You will notice in the Scenery Library menu that SETUP creates 2 Scenery Areas with the following names:

- PTT Standard\_LC by PTSim
- PTT Custom\_LC by PTSim

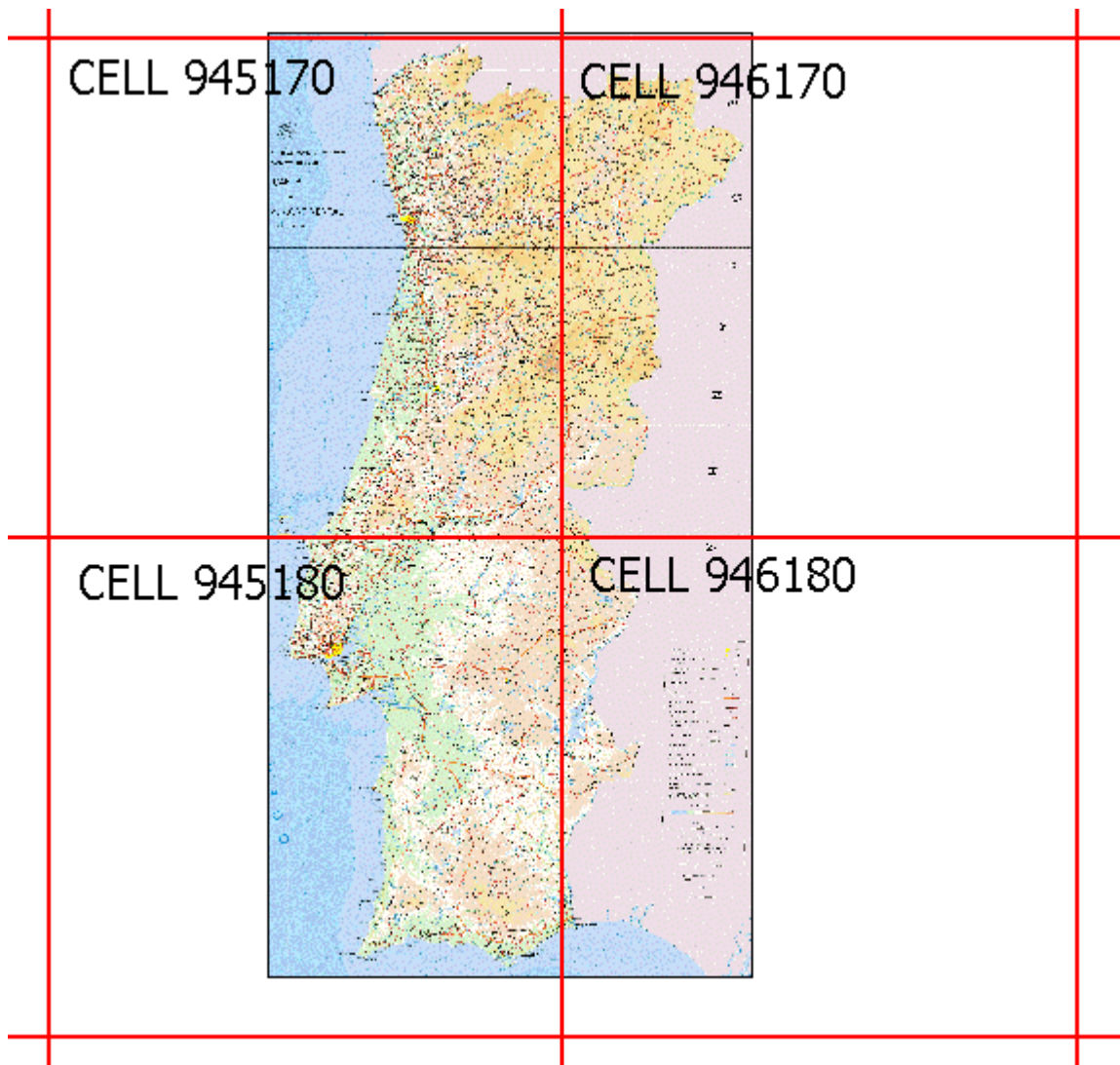
The first Area is a normal “land class scenery Area” with a SCENERY folder containing BGLs and without a sister TEXTURE folder. On the contrary, the Area called **PTT Custom\_LC by PTSim** has both a SCENERY folder and a TEXTURE folder. In the



TEXTURE folder we placed customized textures that allowed us to “create” special Land Classes as the one designed to represent the typical brown cliff of the Algarve coast.

In the standard Land Class Scenery folder you will see 4 BGL files with names starting with LD (land) and 4 BGL files with names starting by WT (water). These 8 files constitute the standard Land and Water class scenery for Portugal Terrain. The suffix numbers refer to the Cell that the file is related to according the following figure.





The Water Class scenery forces FS2004 to use water textures that match the textures of the rivers in Portugal Terrain.

You will also see a SEASONS.BGL file in the standard Land Class Scenery. This file defines the seasons by extending the snow season to some mountains in the north of Portugal. In the default scenery, snow only appears on the very top of Serra da Estrela.

The remaining files found in the standard Land Class Scenery folder refer to the photographic scenery and are discussed in a different section of this manual.

The custom Land Class scenery folder contains the 4 custom Land Class BGL files with names starting with LD (land).

## 2.4. Roads and Railroads

The road system used in Portugal Terrain has 2 requirements:

- to allow VFR flights following the roads
- to be compatible with the Autogen scenery

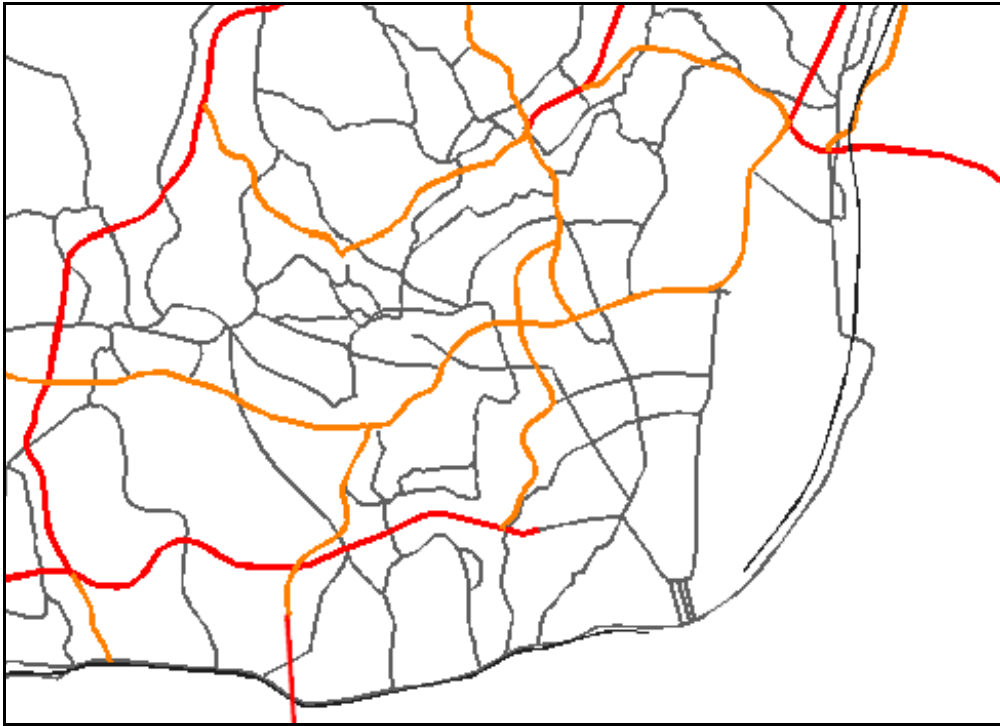
The first requirement is of special importance in non-urban areas where the road system can be very useful to the VFR pilot. For example you can flight from Porto to Lisbon or vice-versa having the A1 motorway as a visual reference. On the contrary, on metropolitan and urban areas, roads are not so important for orientation.

The second requirement is related to the fact that roads exclude autogen scenery that they cross. Therefore, in urban areas, a dense grid of residential streets almost excludes all autogen scenery existing in the area. The approach taken in Portugal Terrain has been to represent only the more important roads. Actually the roads represented in Portugal Terrain correspond to the ones that appear in the map “Carta Militar Itinerária de Portugal” given in reference [1] of section 1.

The BGL files for the road and railway system are shown in the following table.

File name	Description
AUTOESTRADAS_VTPL	Major highways
VIASPRINCIPAIS_VTPL	Principal highways
OUTRASVIAS_VTPL	Other highways
ESTRADAS_VTPL	Main roads
VIASFERREAS_VTPL	Railways

The road density in the city of Lisbon is shown in the first figure of the next page. The second figure shows the fitting between the roads and the photographic scenery.



## 2.5. Photographic Scenery

Photographic scenery in Portugal Terrain is limited to the following regions: Cascais and Portimão. You can use the Go to Airport menu and chose LPCS (Tires - Cascais) or LPPM (Portimão) to visit these 2 areas. The BGL files responsible for the photographic scenery belong to the standard Land Class Scenery folder already referred to.

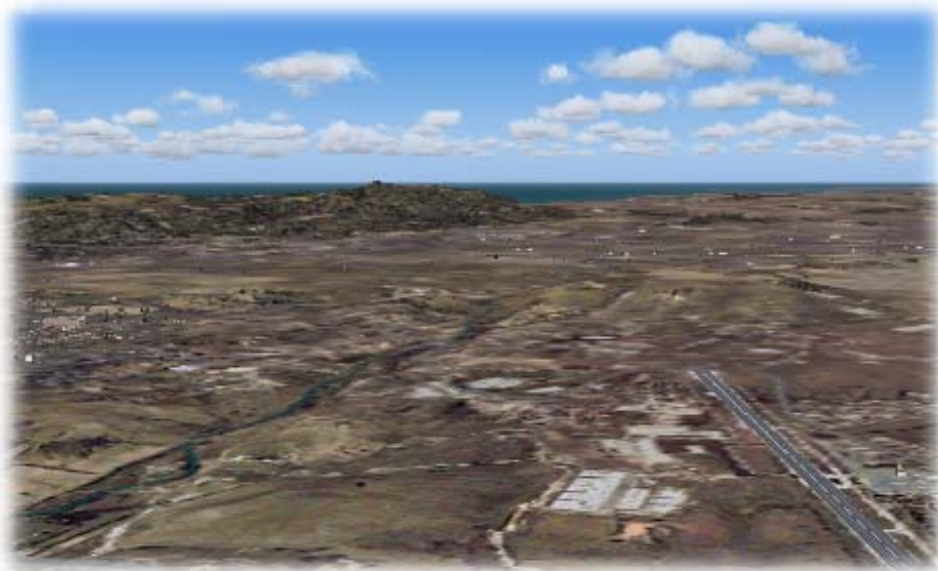
The photographic scenery is not restricted to land and extends to the sea. By extending



the photographic scenery to the sea, it is possible to represent, for example, the clear green water that is typical in the Algarve. However there is a potential conflict with water reflections effects. If you see water squared blocks in the regions covered by the photographic scenery, reduce the “Water Effects” to Low or to None in the “Options > Settings > Display > Scenery” menu of FS2004. If you prefer to have the water reflections effects instead of the water photographic scenery, rename the extension of the files CASCAIS\_MAR\_PH1.BGL and ALVOR\_MAR\_PH1.BGL .



It is also important to note that the photographic scenery has (4) seasonal variations and night textures. In addition it blends naturally with the surrounding default textures. These points are illustrated in the next 2 pictures that show a summer and a winter view of theTires Aerodrome in Cascais.





## 2.6. Location of Aerodromes and Objects

The geographic location of many small airfields in the default scenery is wrong and Portugal is no exception. In order to correct the horizontal (latitude and longitude) and the vertical (altitude) position of wrong airfields, new AFCADs were produced. They constitute the files AF2\_LPXX that appear in the main scenery folder of Portugal Terrain. In the cases in which the altitude of the airfields had to be changed, the default files AP9XXYY0.BGL had to be patched as well (see section 4).

The distribution folder DOCS contains an Excel file (Airports.XLS) with all the data used in the correction of the locations of the Airports. The label “nc” means that the airport had no change in relation to the default. These changes also included default flattens. For example, there is an error in the default implementation of the Lisbon Airport. The error is that the altitude of the AFCAD for Lisbon is slightly lower than the altitude of the default flatten polygon. This difference is visible when you are on a small aircraft and it shows as if the runway surface was peeling off the ground. The meaning of the files used in the correction of the airfields is shown in this table:

File name	Description
LPXX_0EX	Exclusion for the original airport ground polygon
LPXX_LWM	Flatten polygon to set the altitude
LPXX_VTTP	New airport ground polygon (grass)

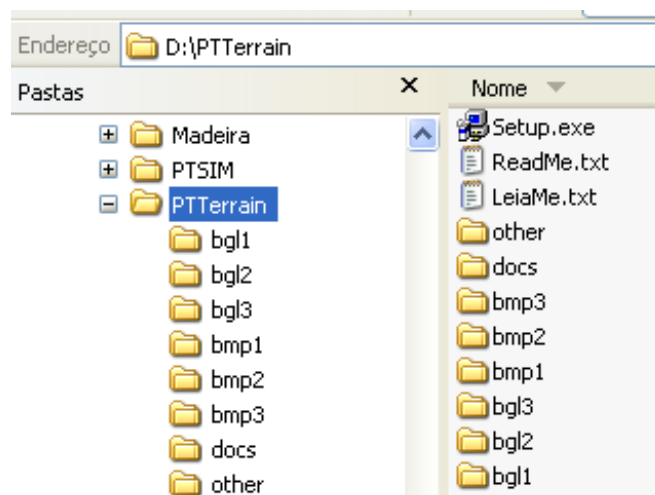
In order to finalize the technical description of all the BGL files found in Portugal Terrain we need to refer the files that contain 3D objects and other stuff:

File name (or part of)	Description
000_XXXX	Exclusion of objects related to XXXX
25DEABRIL_XXX	Files related to 25 de Abril Bridge
PTT_JEFF_XXX	Files related to objects by Jeff Stanyer
VGAMA_XXX	Files related to Vasco da Gama Bridge

### 3. Installation

It is impossible to install Portugal Terrain without using the supplied the installer programme called SETUP.EXE. The reason is that the BGL files that you receive in the folders BGL1 BGL2 and BGL3 have been encrypted. The programme SETUP not only copies these files into the folders that you choose to install the scenery, but it also deciphers the files. During the installation of the scenery it is necessary that your computer be connected to the Internet.

If you bought the Online version of Portugal Terrain you should unzip the contents of the ZIP archive to a temporary folder. The following picture shows a temporary folder, D:\PTTERRAIN, to where the ZIP file was unzipped. To start the installation, you run the



programme SETUP from this temporary folder. If you bought the CD version of Portugal Terrain you run the programme SETUP directly from the CD. Before you run SETUP you should close FS2004

The main menu of the SETUP programme is shown in the following page. When you install Portugal Terrain for the first time you will choose Option1 – “I want to activate Portugal Terrain scenery!”. You will be prompted with the License Agreement that you should fully read and accept in order to continue the installation.

You shall note that you cannot install Portugal Terrain simultaneously in 2 computers. Therefore you should be installing the scenery in the computer that you will be using in the long term.



After accepting the License Agreement you will be presented with a page from the PTSim website like the one in the following picture. You will introduce your Product Code in the box and you press "Continue". This Product Code has been sent to you by email if you bought the Online version or you can find it printed inside the CD box.

If you introduce a valid Product Code you will be directed to a second page where you need to enter your Name, your Surname and your Email. There is a "Submit" button on the bottom of the page that you press to continue the Activation process.





After you close the window shown above, you should search you mailbox for an email sent to you by PTSIM similar to this one:

Dear Luis Sa

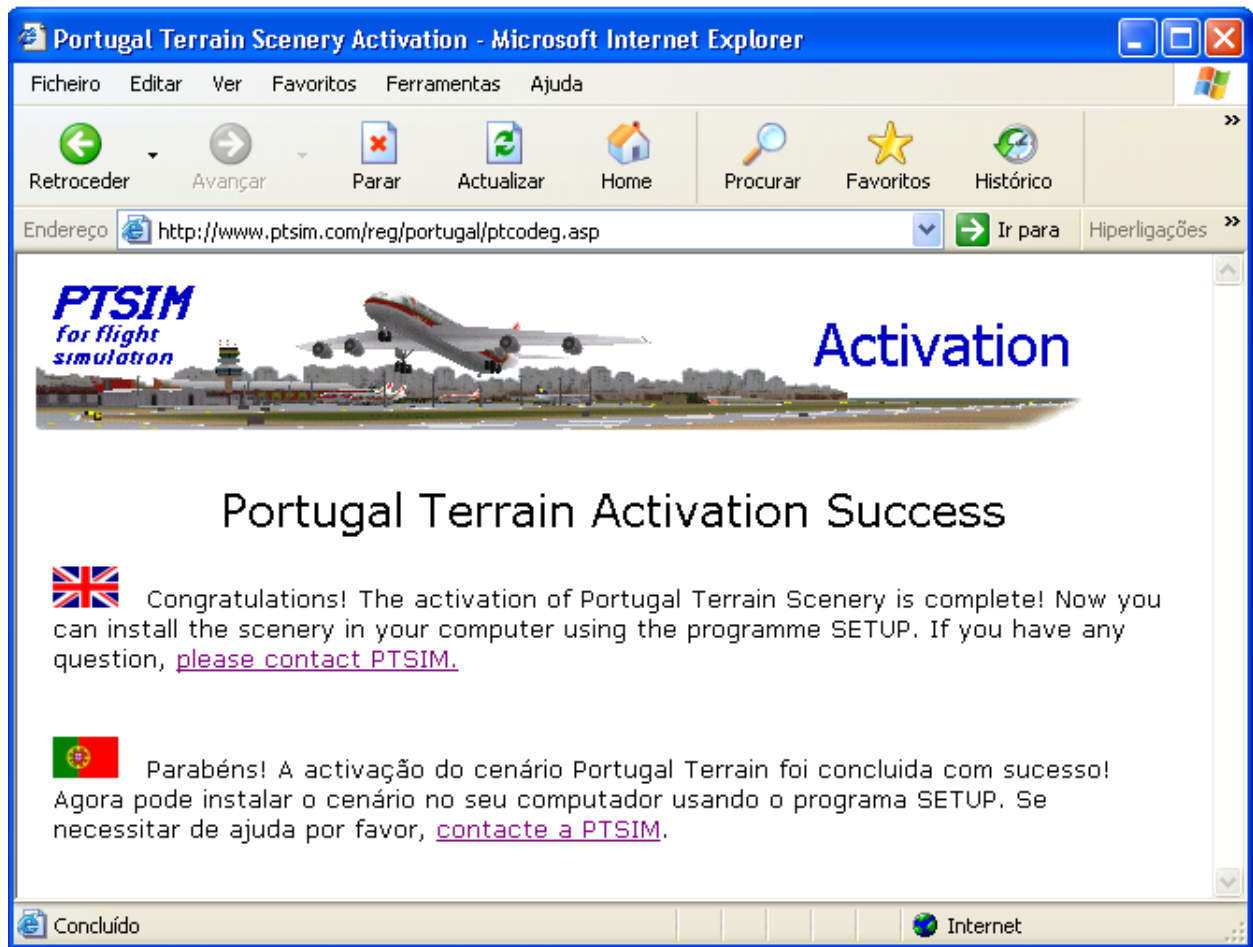
Thank you for activating Portugal Terrain Scenery! In order to finish the activation process, you only need to visit the following link:

<http://www.ptsim.com/reg/portugal/ptxyz.asp?a=XY123-XY123-XY123-XY123-XY123&b=8138>

Please contact us if you need any assistance.



If you press the link that appears in the email you will get the following page:

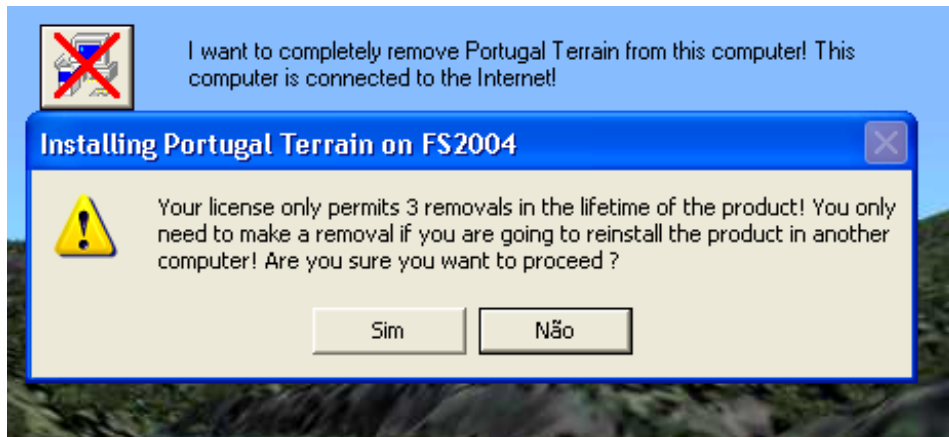


and the activation is complete! You never need to repeat this again even if you are going to install the scenery several times.

Now you can install and uninstall the scenery as many times as you require using Option 2 and Option 3 respectively. You only need to have the PC connected to the Internet during the installations.

**Very Important (1):** You should not uninstall the scenery manually! You should always use SETUP Option 3 to accomplish this.

**Very Important (2):** Option 4 in the SETUP programme should only be used when you want to remove Portugal Terrain from the computer in order to install it in a different computer. Due to security reasons we limited the number removals to 3. If you need more than that you should contact PTSim.

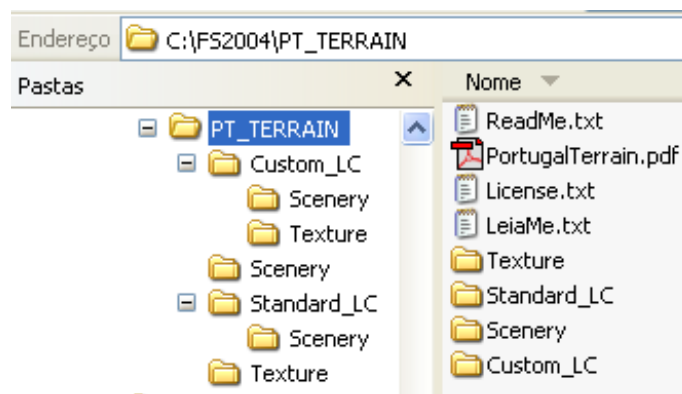


**Very Important (3):** It is not allowed to use the Product Code to install Portugal Terrain in a computer different from the one where you have installed Portugal Terrain in the first place. Not only it is impossible to install Portugal Terrain simultaneously on 2 different computers but also, if you try it more than once, you will never be able to reinstall Portugal Terrain, even in the first computer. If you want to install Portugal Terrain on a second computer you need to remove it from the first computer as referred to in the previous note.

## 4. Changes made by SETUP

Basically SETUP copies files from folders called BGL1, BGL2, BGL3, BMP1, BMP2 and BMP3 (see section 3) into their final destination folders. It also makes some changes to FS2004. The complete operation of SETUP is described in this section.

The first thing that SETUP does is the creation of a structure of folders where it installs the scenery. The location of these folders depends on the location entered by the user during the installation. In this picture the folders were created under the path name C:\FS2004\PT\_TERRAIN:



ReadMe and License files are copied to the main folder as well as the file containing the manual that you are reading. The following table describes the type of files that are created inside the folders shown in the previous figure:

Folder	Type of files
..\Scenery	Deciphered BGL files from BGL1
..\Texture	Bitmap files from BMP1
..\Standard_LC\Scenery	Deciphered BGL files from BGL2
..\Custom_LC\Texture	Deciphered BGL files from BGL3
..\Custom_LC\Scenery	Bitmap and AGN files from BMP3

SETUP copies 615 bitmaps from BMP2 to the standard texture folder of FS2004:

C:\Programas\Microsoft Games\Flight Simulator 9\Scenery\World\texture

These bitmaps are the photographic bitmaps used by Portugal Terrain. An example of one of these files is 012112132130002Wi.bmp. You can identify the files by looking to the creation date of the files.

The file "C:\Documents and Settings\Luis Sa\Application Data\Microsoft\FS9\FS.CFG" (the path name of the file can be different from the one shown) is also read by SETUP, which sets the following parameter:

TERRAIN\_MAX\_VERTEX\_LEVEL=21

This setting is needed for proper display of high-resolution meshes, as it is the case with Portugal Terrain. When you uninstall Portugal Terrain, SETUP ignores this setting. In fact other add-ons may need this setting and SETUP should not modify it when uninstalling Portugal Terrain.

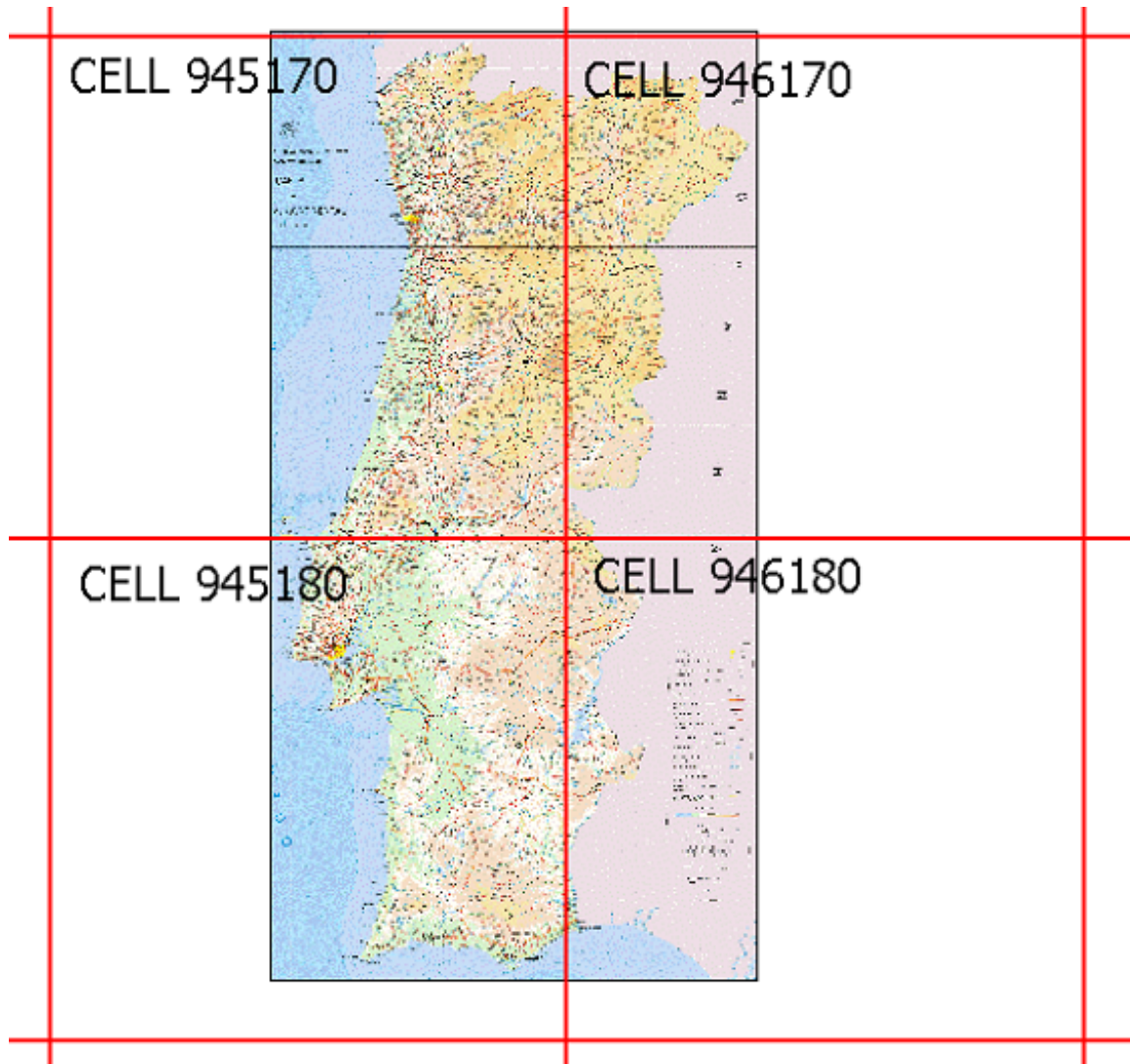
SETUP adds, and activates 3 Scenery Areas in the Scenery Library (scenery.CFG) so that you do not need to do it yourself. SETUP uses the following names:

Areas list		
Enabled	Scenery Area	Priority
<input checked="" type="checkbox"/>	Portugal Terrain by PTSim	1
<input checked="" type="checkbox"/>	PTT Custom_LC by PTSim	2
<input checked="" type="checkbox"/>	PTT Standard_LC by PTSim	3

We left to the end the more delicate (and controversial) changes made by SETUP. We are referring to a group of standard files that exist in the following folder:

C:\Programas\Microsoft Games\Flight Simulator 9\Scenery\Eurw\Scenery

We repeat here a picture that illustrates the convention for the names of the relevant files. Cell 945180 has no problem as it is fully covered by the scenery in Portugal Terrain. The problems are with the files that refer to the other 3 Cells since they are common to Portugal and Spain.



The table in the following page lists all the changes made by SETUP. First of all you will notice that the extension of all the original files was renamed from BGL to PTS. Therefore, never delete a file with extension PTS in that folder. As we have already suggested, SETUP should be used to uninstall the scenery as it changes the files to the default settings and names.



Files	Change	Comment	"Files for Spain"
AP945170 AP946170 AP945180	Renamed to PTS	New files with same name with corrected altitude in some aerodromes (see section 2).	None, as new files were used with the same name.
HP945170 HP945180 HP946170 HP946180	Renamed to PTS	Hydro polygons. Spanish part of Cell 945170 contained in COSTA_LWM.	HP946170_LWM HP946180_LWM
HL945170 HL945180 HL946170 HL946180	Renamed to PTS	Hydro lines. Rivers and Lake banks. Shorelines. Spanish part of Cell 945170 contained in COSTA_VTPL.	HL946170_VTPL HL946180_VTPL
RR945170 RR945180 RR946170 RR946180	Renamed to PTS	Railways.	RR945170_VTPL RR946170_VTPL RR946180_VTPL
RD945170 RD945180 RD946170 RD946180	Renamed to PTS	Roads.	RD945170_VTPL RD946170_VTPL RD946180_VTPL
UT945170 UT945180 UT946170 UT946180	Renamed to PTS	Utility (electricity) lines. Not used in Portugal Terrain.	UT945170_VTPL UT946170_VTPL UT946180_VTPL
ST945170 ST945180 ST946170 ST946180	Renamed to PTS	Streams (small rivers).	ST945170_VTPL ST946170_VTPL ST946180_VTPL
FL945170 FL945180 FL946170	Renamed to PTS	Flattens. There is no default flatten in Spanish part of Cell 945170.	FL945180_LWM FL946170_LWM

In the column “Files for Spain” we list the files that are installed in the standard Portugal Terrain scenery folder and which contain the information regarding to the Spanish territory. This information is exactly the same as in the default files.

**Important note to scenery designers and developers:** if you are designing scenery that concerns to Cells 945170, 946170, 945180 and 946180 and you find that your scenery may conflict with Portugal Terrain, please enter in contact with us. We will do our best to provide information and support to make the sceneries compatible.

## 5. Compatibility with other sceneries

Portugal Terrain is base landscape scenery to be used in conjunction with other sceneries. One of these sceneries will be PTSim's out coming **Aerodromes of Portugal**, which will be fully integrated and compatible with Portugal Terrain.

In the following tables we list some sceneries known to us that can be used with Portugal Terrain. We thank all the authors of these sceneries for collaborating in the testing of Portugal Terrain or for trying to solve compatibilities issues. In most cases there is a reasonable compatibility between the sceneries. You can use our forum at:

[http://www.ptsim.com/forum/forum.asp?FORUM\\_ID=21](http://www.ptsim.com/forum/forum.asp?FORUM_ID=21)

to get information on possible solutions that may appear to increase the compatibility between the listed - or other - sceneries.

Title	Braga LPBR v1.2
Description	Braga Aerodrome
Author	José Maia
Price	Freeware
Availability	Download from <a href="http://www.avsim.com">www.avsim.com</a>
Compatibility	An update could be published
Title	Faro 2005 by Aerosoft
Description	Faro International Airport
Author	Michael Kopatz
Price	Euros 14.95
Availability	<a href="http://aerosoft-shop.com/">http://aerosoft-shop.com/</a>
Compatibility	Zip file available from <a href="http://www.ptsim.com/en/support.htm">http://www.ptsim.com/en/support.htm</a>

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Title	Project Lisbon Photoreal v3.0
Description	Lisbon International Airport and city of Lisbon
Author	Pedro Oliveira
Price	Freeware
Availability	Download from <a href="http://www.ptsim.com/en/support.htm">http://www.ptsim.com/en/support.htm</a>
Compatibility	Includes instructions on how to work with Portugal Terrain

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Title	Projecto Portugal Perfeito PPP v3.0
Description	Lisbon, Porto and Faro airports and other small aerodromes
Author	PPP team
Price	Freeware
Availability	<a href="http://www.airsim.net/ppp/index.htm">http://www.airsim.net/ppp/index.htm</a>
Compatibility	Some points need to be addressed to increase compatibility

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## 6. A Challenge

We would like to incite you to enhance Portugal Terrain scenery by adding 3D objects to it! We will try to make it easier by showing you a small example of what you can do. We hope that you can accept this challenge and that you share your realizations with all Portugal Terrain users.

First of all we would like to tell you about Sbuilder. Sbuilder is a programme that we developed to make Portugal Terrain and which other scenery designers are using. You can download version 2.02 of Sbuilder from the AVSIM File Library or from PTSim web site. In order to help you start working with Sbuilder, we included several files inside the folder called /other/sbuilder. These files are maps that you can use with Sbuilder. The filenames give you an idea of what the maps refer to.

In the following exercise we assume that you can start Sbuilder. The aim will be to place a lighthouse and a vessel ship as in this picture:



By the way – the place in the picture is São Jacinto near Aveiro. This is important, as you need a map of Aveiro to guide you in the placement of the objects!

So, with Sbuilder started, follow these steps:

**Step 1** – Press the “New” button in the Sbuilder toolbar to start a new Project.

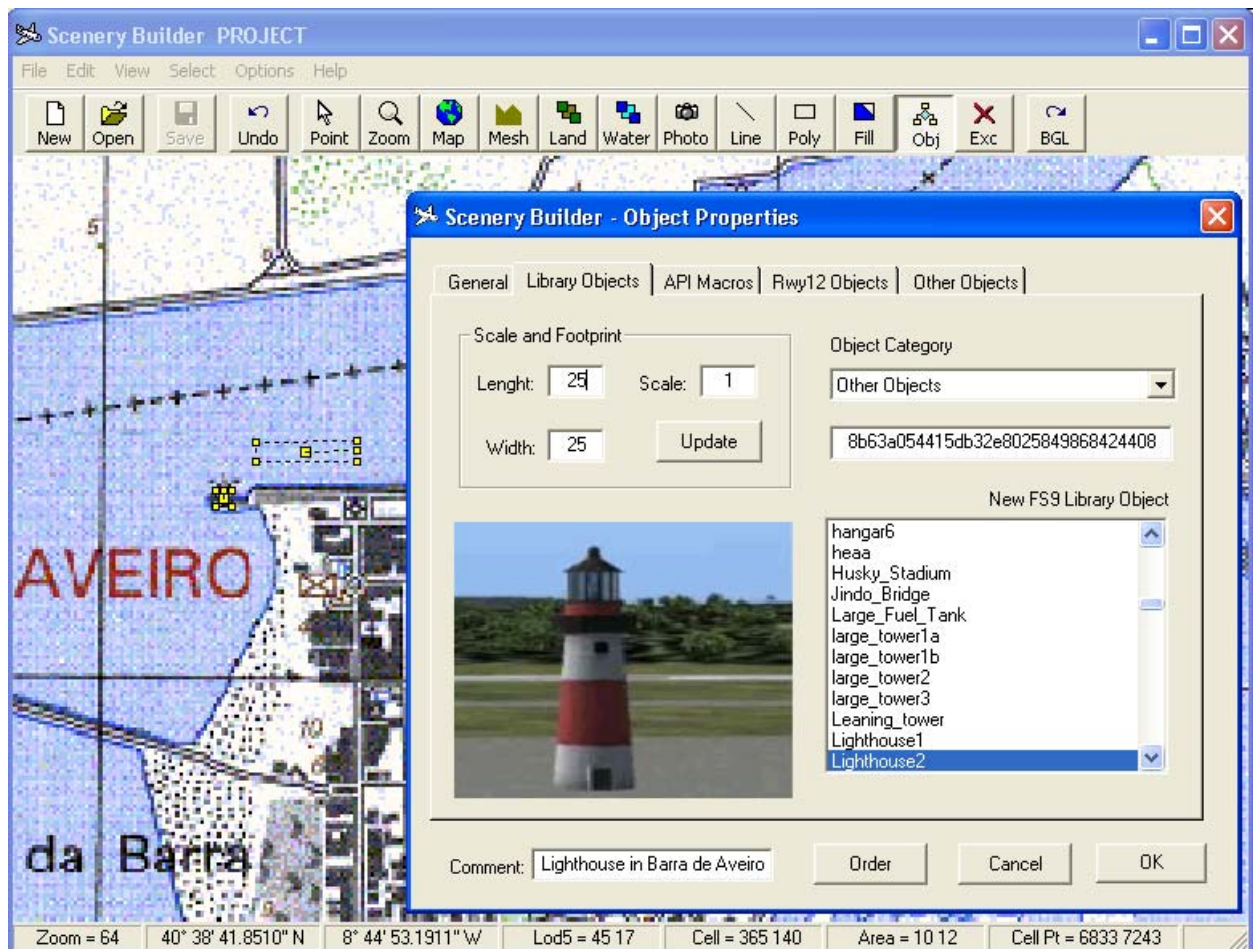
**Step 2** – Press the “Map” button in the Sbuilder toolbar to add a background map. As soon as you press the button, a common “File Open” dialogue window will be presented and you will point to a file called **aveiro.bmp** in the folder /other/sbuilder.

**Step 3** – Press the “Object” button in the Sbuilder toolbar to enter into the “Object placement mode”. Then click on the map where you think the vessel should go. As soon as you click on the map a window will appear where you choose the type of vessel from a built-in library of objects.

**Step 4** – you can keep on adding objects just by clicking the map with the mouse. But, for the moment you will click just once more to place the lighthouse. You click in the place where you want the lighthouse and, as you have done for the previous object, you choose a lighthouse from a collection of ready-made objects.

(advance to the next page to see the window that Sbuilder shows at this stage ...)





Looking to window where you select the objects you will see that we are selecting Lighthouse2. In that list (bottom right) you will see that there is another Lighthouse1 just in the line above Lighthouse2. If you were to pick up that Lighthouse1 the picture on the left would you how it would look like so that you could decide which one to use.

On the map (just above the word AVEIRO) you can see 2 small boxes in yellow that represent the 2 objects that you have placed. To finalize the exercise you need to follow 2 more very simple steps.

**Step 5** – “Select All” in the Sbuilder menu

**Step 6** – Press “BGL” button in the Sbuilder toolbar to generate the BGL file. Now start Flight Simulator and look to your creation!

## 7. Acknowledgements

The author of this work is grateful to IGeoE - Instituto Geográfico do Exército, where he worked in the preparation of the digital elevation model used in this project. He also wants to thank many individuals and friends who helped him in this project. Firstly, he is in debt to Jeff Stanyer from Australia who always encouraged him since the early developments of Sbuilder. Jeff likes to help and the proof is his offer to design some of the few 3D objects that are included in the scenery such as the Tower Vasco da Gama in Lisbon. João Ferreira meticulous testing was also truly appreciated. João had the trouble to check all the coastline, rivers, lakes and so on. If you notice, for example, that some beach is missing along the coast, be sure that João told me that before. My colleagues of profession, José Fortuna and José Oliveira, provide me with an invaluable technical support. During the testing, their opinions were always available and appreciated. Pedro Oliveira and José Maia are authors of other sceneries for Portugal - Lisbon and Braga, respectively. Both provided me with careful testing of the regions that they know very well. I think I disappointed Manuel Formas because of the lack of 3D objects in Portugal Terrain. I only want that he is still available for sending me the pictures with errors when the time comes to test Aerodromes of Portugal. I want to thank António Delgado from Cabo Verde, who had the trouble to make downloads of several hours only to help in the test of Portugal Terrain. I also would like to thank Edmundo Azevedo, Jorge Diogo and José Pereira for helping in the test of Portugal Terrain.

These acknowledgments would not be complete without mentioning the Microsoft Flight Simulator Development Team for the continuing development of the FS series and the many participants of the Scenery Design Forum at AVSIM. Between them I would like to name 2 persons - Holger for the tips on custom Land Classes and Horst for sending me lots of ideas about Sbuilder.

Coimbra, February 12, 2005.

Luis Vieira de Sá,