

Scenery Solutions and Flight One Present

# Ultimate Terrain For MSFS

(The complete terrain scenery enhancement for Microsoft Flight Simulator)



**A Flight One Software / Scenery Solutions Product**

# Ultimate Terrain for Microsoft Flight Simulator

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## About Source Data Used In “Ultimate Terrain For MSFS”

Our goal at Scenery Solutions is to create superior terrain products for MSFS, utilizing the absolute best data in the industry.

In order to produce the best products, you have to have the best source data. With USA Roads, Scenery Solutions was the first MSFS developer to use commercially licensed source data in their product.

With our Ultimate Terrain product series, we have built up our relationships with the worlds best producers of commercial data.

Our Ultimate Terrain series of products will currently utilize data from Navteq, TeleAtlas, and DMTI Spatial where necessary.

### About NAVTEQ (NYSE: NVT)

NAVTEQ is a leading provider of comprehensive digital map information for automotive navigation systems, mobile navigation devices and Internet-based mapping applications. NAVTEQ creates the digital maps and map content that power navigation and location-based services solutions around the world. The Chicago-based company was founded in 1985 and has approximately 1,400 employees located in over 100 offices in 20 countries.

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### About DMTI Spatial

DMTI Spatial is a software and data company specializing in address and geospatial related applications and data. DMTI Spatial creates and publishes the market-leading street map, rail and routing data in Canada (CanMap®) and the market-leading geocoding software for Canada (GeoPinpoint™) and has a growing business in the address management field. The company also publishes an extensive portfolio of other spatial data products.

### About TeleAtlas

Tele Atlas is a leading provider of digital maps for a variety of navigation products and enterprise and consumer solutions. Our database is the most accurate reproduction of today's street network, enabling turn-by-turn route guidance on virtually all European and North American roads. Singapore, Hong Kong and large parts of Australia are covered as well. Our compatibility with all major navigation systems and our open system design have placed us at the heart of both consumer and business-to-business applications across the world.

## Feature Overview – Product Highlights

Scenery Solutions was the first company to utilize GPS quality road data in Microsoft's Flight Simulator, with our *USA Roads For Microsoft Flight Simulator* product.

With *Ultimate Terrain For MSFS (For Microsoft Flight Simulator)*, we give you the same USA Roads quality, and much, much more, all in one package.

Product Highlights:

- ❖ Adds every available road from Navteq's commercial navigation data. Each road is accurately placed in FS2004 to match its real world location.
- ❖ Adds enhanced railroads using railroad data by DMTI Spatial in Canada, and Navteq railroad data in Alaska.
- ❖ Adds a new night lighting environment unlike anything else on the market. This feature will add actual points of light, to simulate street lights, automobiles, and rural farms. Previously, this functionality has only been seen in many professional flight simulators.
- ❖ Adds corrected Oceanic coastlines, plus islands, lakes and rivers, based on Commercial data. No more roads over water (except water crossings of course) !
- ❖ Adds much more accurate landclass textures in metropolitan areas.
- ❖ Adds detailed land polygons for things like parks, golf courses, and cemeteries. The polygons will align with the road boundaries, just like you see them on high quality mapping services and GPS units.
- ❖ Scenery files are released on complete LOD5 cell boundaries, to better blend in with existing FS2004 scenery areas, and other products that take the extra effort to ensure compatibility.

## Product Coverage Area

The *Ultimate Terrain For MSFS* actually consists of a series of individual products, with each covering a specific area of the world.

Included with the purchased software you will receive this manual, plus a user's guide that pertains specifically to the region in question.

Please consult the additional user's guide for more information on specific product coverage areas.

## Product Support

Please read the FAQ section of this document. The FAQ (frequently asked questions) section should answer the most common questions regarding this product.

For further answers to your questions, please visit the "Ultimate Terrain" forum hosted by Flight One Software (Flight1). You can find this forum at [www.simforums.com](http://www.simforums.com).

Forums are a terrific support venue. They allow all users to access to information that would normally be private with an Email support base.

Flight One product forums can be viewed at [www.simforums.com](http://www.simforums.com). For support related to this product, please see the "*Ultimate Terrain*" forum specifically.

You can also visit the Scenery Solutions website at [www.scenerysolutions.com](http://www.scenerysolutions.com) for updated information.

# ***Ultimate Terrain* Product Details**

## Roads

### Road Accuracy

As you know, the roads that come with FS2004 contain only major highways, and not many of them at that.

*Ultimate Terrain For Microsoft Flight Simulator* will add primary and secondary roads, highway access ramps, trails, and local/neighborhood/rural roads. Unless your home is on a brand new street or dirt road, it is probably included in this package (actually some dirt roads are included too).

The licensed source data, used in this product, provides the most accurate and recent road information currently available. Divided roadways/highways are displayed in their correct positioning for both sides, not just as a single line using a divided road texture.

With the *Ultimate Terrain For MSFS*, the frame rate impact due to the roads is not noticeable on most systems. This is true even in the most densely populated urban areas.

### Updated Road Textures

*Ultimate Terrain For MSFS* gives you a highly configurable set of night and day textures.

There are over 100 combinations of night lighting textures that can be used. The configurable night lighting elements include:

- ❖ The type of lighting (high pressure sodium, low pressure sodium, mercury vapour, FS2004 color match, or no lighting).
- ❖ The pavement reflectivity (bright, dim, or dark)
- ❖ The road traffic density (high, mixed, low, very low, or none).

The new night textures provide for more accurate looking street-light effects. Also, the street lights taper away as you leave metropolitan areas and isolated cities (this feature can be turned on/off by the user).

In addition to the night textures, you are given the choice of two different day textures (one with brighter pavement and one darker pavement).

## Configurable Road Choices

Ultimate Terrain roads are broken into 2 separate data sets. One set contains all road types outside the cities, with only major roads and highways inside the cities. The other set of data contains only residential (minor) roads within the city areas.

We broke the data apart because some users prefer only major roads in the cities, which already have the default FS2004 city landclass textures present. These city landclass textures have fake roads built into the textures themselves, which can sometimes clash visually with roads drawn on top of them.

You can turn each data set on and off to your liking. Most users will probably select both, which displays all the available roads.

## Railroads

*Ultimate Terrain For MSFS* also includes enhanced railroads. In Canada, DMTI Spatial's highly detailed railroad data is used. This will provide accurate railroad data throughout Canada. In Alaska, Navteq data is used which will provide enhanced railroads for some of the bigger metropolitan areas. The updated rail packages will show multi-track railroad yards, where they actually exist. The default FS2004 data contains no multi-track railroad yards.

## Enhanced Night Lights

This new feature will completely change your night flying experience.

Instead of simulating lights in the ground textures, you can now have actual points of light emitting from positions above the ground textures. This is a feature that you normally see in only professional flight simulators.

Light points are displayed for street lights, automobiles, and the occasional farm or other complex.

- ❖ Street lights only appear in urban areas (as in real life), but automobiles may appear anywhere.
  
- ❖ Automobile light traffic is based on the road densities. This will give major roads in major metropolitan areas heavy traffic, while smaller towns will have lighter traffic. Traffic will continue outside city limits, even without street lights. The traffic will gradually reduce for areas with few cities.
  
- ❖ Random clusters of lights are placed to simulate farms and other lighted structures.

*\* Note: simulated traffic is stationary (does not move).*

## Enhanced Water Data

As you probably know, the water features in FS2004 are not positioned very accurately. Even though enhanced road products (i.e USA Roads) added highly accurate roads, the roads would sometimes cross water in FS2004 because of the inaccurate water locations.

Now, with *Ultimate Terrain For MSFS*, you will no longer have roads crossing the water. The enhanced water areas and shorelines will wind around with the roads, as they should.

Also, lakes, and other flat water bodies, are positioned using 90 meter DEM data (digital elevation data). You will not see lakes running up the sides of mountains (unless they are classified as rivers). Instead, the terrain will be “flattened” around the lake, to allow the lake to be displayed flat.

The enhanced water includes oceans, islands, lakes, and rivers. Each item is drawn in it’s natural polygonal shape.

Streams in FS2004 are often drawn as textured lines. These objects are not as visually pleasing as rivers or streams drawn as polygon objects. In many product areas, we will choose not to upgrade the streams, unless they can be drawn as polygons. The Ultimate Terrain Setup utility gives you the choice of turning the default FS2004 streams on and off. Many of the rivers in Ultimate Terrain appear only as lines in FS2004. So, you may wish to turn the default FS2004 streams off.

## Enhanced Landclass

### What is landclass ?

The terrain "surface" in Microsoft's newest flight simulators are broken down into rectangles that are roughly 1.2 km x 1.2 km in size (MSFS scenery designers know these as LOD13 cells).

Each one of these "cells" has a unique classification value attached to it. For example, a value 121 will display a texture containing hi-rise buildings, whereas a value of 107 will show more of a suburban setting. FS2004 will blend adjoining textures to present a more eye-appealing look, and to avoid an artificially tiled look.

The landclass system used in FS2004 presents a very efficient way of displaying different types of terrain, without severely limiting the machines performance.

The drawback to this system, is that small parks and other types of terrain are too small to be included in the 1.2km x 1.2km cells. Also, it is impossible to accurately position the landclass to it's exact worldly location, because an entire cell is of the SAME TEXTURE TYPE must be 1.2km x 1.2km.

Still, the landclass system used in FS2004 can give a reasonably accurate portrayal of the terrain types. It is just not as accurate as GPS quality roads and water polygons in FS2004.

### Ultimate Terrain's Landclass Enhancements

Landclass packages for FS2004 are normally derived from land use data, which is freely available to the public. This data is accurate enough to be used effectively for most areas in FS2004, but the data can be very several years old (or even more than that).

As you know, metropolitan areas are constantly expanding. The dated data used in most landclass packages can often result in an inaccurate portrayal of cities and towns in FS2004

Our landclass enhancements will greatly improve the accuracy of cities and towns, because they are based on road coverages and point-of-interest data from Navteq, rather than dated land use maps.

Many towns left out of FS2004 will be visible with our landclass enhancements. Also, cities are no longer big blobs of hi-rise textures, surrounded by another ring of suburban textures.

Our landclass data will place the appropriate landclass textures based on commercial and residential building densities within particular areas.

We also include landclass data for areas that were left out of FS2004. This is necessary if you want to draw islands and other land features over water, when there was previously no landclass defined for that area.

In most areas, we use a transparent setting to pass thru to the next available landclass package in the FS2004 Scenery Library. This means that you can use another landclass product, in conjunction with Ultimate Terrain's landclass, for areas outside the cities.

Overall, we think you will find this a big improvement over the original landclass data in FS2004.

## Detailed Land Areas

The commercial data we use gives us the ability to display detailed mapped data such as city parks, golf courses, and cemeteries in FS2004. This data is displayed as detailed surface polygons, not landclass. So, you will see the data displayed at it's real world coordinates, shape and size.

What does this mean to you ? Well, they will certainly improve your VFR navigation, because you can use them as a point of reference. If you were to follow the appropriate roads to a city park, cemetery, or golf course, you will find the appropriate texture right where it is supposed to be.

Most of these detailed land areas are limited to the larger cities in Ultimate Terrain. The exact coverage areas are completely based on the available source data.

# Ultimate Terrain For MSFS – Quick Startup

To make use of the features in *Ultimate Terrain For MSFS*, you need to:

1. Run the Setup utility to turn the desired options on/off. This utility will start automatically following installation, or can be executed at any time later on. **On startup, all Ultimate Terrain features will be turned off the first time the Setup utility is executed.**
2. Run the Texture Configuration Utility to change the look of the Scenery Solutions roadway environment, if desired. This is not necessary, as a default set of textures is already installed.
3. Make sure that the Scenery Complexity slider in FS2004 is set to Normal (for all enhanced lights) or Sparse (for only lights in the cities).

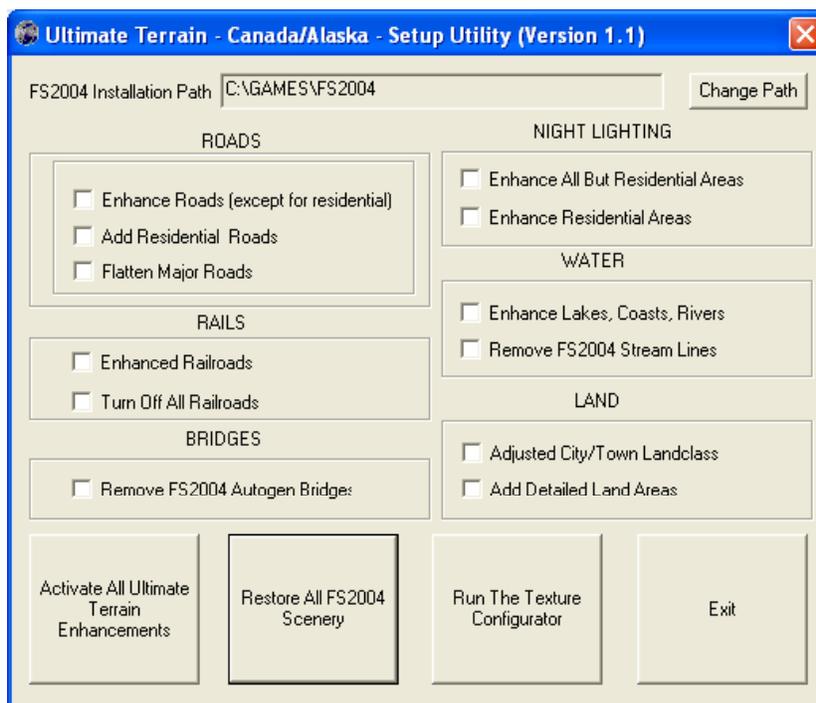
*Step #2 is optional. A default set of textures is initially setup for us during the installation.*

# Ultimate Terrain For MSFS – Setup Utility

Immediately following the installation process, the “*Ultimate Terrain For MSFS*” setup utility will be called.

You should see something similar to the window in figure 1-1.

Figure 1-1



At this time, FS2004 is still configured to use the default terrain. You can activate the various features one at a time. Or, you can turn all features on or off at once by pressing:

- ❖ “Activate All Ultimate Terrain Enhancements” to turn on all recommended features.
- ❖ “Restore All FS2004 Scenery” to remove Ultimate Terrain enhancements.

## ROADS (3 options)

This setting will control which type of roads are displayed in FS2004.

When you change this setting, the application will begin changes immediately following an OK from the user.

### Enhance Roads (except for residential)

This option will turn on most Ultimate Terrain road features. It will add highways, primary roads, and access ramps to the cities. Outside the cities, all road types will be included (adding residential roads, trails, and other secondary roads to those listed previously).

Some users think the Ultimate Terrain For MSFS landscape is too cluttered with all the roads displayed in the cities. This is partially due to the fact that many of the urban terrain textures in FS2004 give the appearance of having imbedded roads. As a result, this option will not add residential roads to the cities.

Also, it has been reported that fewer residential roads will increase the number of autogen buildings.

*To turn on residential roads in the cities, you have to check both this option, plus the next option.*

### Add Residential Roads

This option will turn on residential roads in the cities. To turn on all available roads in Ultimate Terrain, you should click this option, plus the previous option ("Use Ultimate Terrain Roads").

### Flatten Major Roads

Flattening roads gives a better visual affect in very hilly or mountainous areas, because the terrain is "cut away" to allow a flatter road to be drawn over the terrain. This option will flatten highways in the cities, and all major roads (including highways) outside the cities.

Activating this feature may reduce overall system performance somewhat.

## RAILS

You have three options regarding railroads: Turn on the Ultimate Terrain railroads, turn on the default railroads, or turn off both railroads.

To use the base FS2004 railroads, make sure that both the “Enhance Railroads” and “Turn Off All Railroads” boxes are unchecked.

### Enhance Railroads

Selecting this feature will enhance the railroads. The updated rail packages will show multi-track railroad yards, where they actually exist. The default FS2004 railroad data contains no multi-track railroad yards.

The Canadian railroads use highly accurate rail data from DMTI Spatial. In Alaska, railroads in the large cities will be detailed. Outside of the large Alaskan cities, the railroad quality will be similar to the default. At this time, there is no high quality railroad data for rural areas in Alaska..

If you turn this feature off, you will get the base FS2004 railroads. To remove all railroads, check the next feature discussed.

### Turn Off All Railroads

If you want no railroads at all, click this button

## BRIDGES – Remove FS2004 Autogen Bridges

The autogen bridges that come with FS2004 are positioned based on the roads that come with FS2004. Since these roads are generally incorrect, the autogen bridges will also be incorrect.

Selecting this feature will turn off the autogen bridges, so they do not clash with the Ultimate Terrain road positionings.

You should be aware, that selecting this feature will turn off autogen bridges for all of North America. That is because Microsoft put all the autogen bridge definitions for North America in just a few files.

## NIGHT LIGHTING - Enhance Night Lighting

With Ultimate Terrain Version 1.1, there are now 2 options for the night lighting. This is necessary because it was determined that the night lighting will result in a reduced number of autogen buildings in the large cities. This is true even during the daytime flights, because FS2004 seems to determine autogen coverage at the time FS2004 is loaded (prior to setting the flight time of day).

Activating the night lighting feature will completely change your night flying experience in FS2004. Instead of flat textures painted on the terrain, actual points of light will be displayed as objects above the terrain. Using this effect, we have been able to simulate: street lights, automobile traffic, and random light clusters (for rural farms, etc).

This effect will reduce frame rates somewhat, very similar to turning on sparse or a moderate amount of autogen in FS2004.

Large cities will have more light objects, and will reduce system performance more than flying in rural areas.

Once you have seen the enhanced lighting, you won't be able to fly without it !

## Enhance All But Residential Areas

This option will turn on lights for all major roads and highways. It will not activate residential roads in the cities. By not activating lights in the residential areas, there will be more space for autogen buildings to appear.

## Enhance Residential Areas

This option will add the full night lighting effect, by adding lights to residential streets. By adding lighting to the residential street areas, the number of autogen buildings may be significantly reduced in the heavy residential areas of cities. Most users that flight at night will find the additional lights well worth it.

**Important Note:** In order to see the night light effects, you need to make sure that scenery complexity in FS2004 is at least set to the "Sparse" setting. In order to add automobile lights and farm lighting, the slider should be set to "Normal".

In FS2004, this setting can be reached using the following menus:

Options->Settings->Display->Scenery Complexity

## WATER

### Enhance Lakes, Coasts and Rivers

Activating this feature will provide you with a much more accurate set of water data for FS2004. With this feature activated, you should no longer see accurate roads extending out over inaccurately positioned water.

### Remove FS2004 Steam Lines

All streams (and most rivers) in FS2004 are drawn as textured lines. Most rivers (and even some streams) in Ultimate Terrain are drawn as textured water polygons.

Polygons allow the rivers to be displayed in their natural shape, lines do not.

If you check this box, the default FS2004 stream lines will be turned off. This eliminates the chance that the FS2004 stream/river line data will clash visually with the better rivers in Ultimate Terrain.

Leave this option unchecked if you want to display the FS2004 streams along with Ultimate Terrains rivers. In most cases, you can just leave the streams on, because they will always be hidden beneath water polygons in FS2004.

## LAND

### Adjusted City/Town Landclass

Activating this feature will enhance the FS2004 landclass. The enhanced landclass will portray city and town terrain textures in a much more accurate fashion.

Many small cities and towns left out of the FS2004 will be displayed when this feature is turned on.

The enhanced landclass provided in *Ultimate Terrain* also includes some missing landclass values required for the enhanced water features included in *Ultimate Terrain*. If you disable the *Ultimate Terrain enhanced landclass*, you might see some missing land areas when the “Enhance Lakes, Coasts, Rivers and Streams” feature is activated.

Areas not covered by the Ultimate Terrain landclass will be displayed with the next available landclass product (see Appendix C – FS2004 Scenery Library). If no other 3<sup>rd</sup> party landclass product is installed, the base FS2004 landclass will be used.

### Add Detailed Land Areas

Activating this feature will provide detailed land areas to be displayed on top of the landclass textures. Detailed land areas are displayed in their real-world size, shape, and location. Detailed land features include things like: cemeteries, golf courses, and city parks.

## Change Your Settings Anytime

You can change the settings above any time by re-running the “Ultimate Terrain For MSFS Setup” utility.

### **Before Starting FS2004 !!!**

Anytime you install a new product, FS2004 has to build its scenery data base and generate its scenery file indexes.

This step could take a long time, even minutes. However, it is a one time operation after installing Ultimate Terrain. Smaller delays will occur every time you make changes with the Ultimate Terrain Setup utility.

This is just something to be aware of. If your system hangs while FS2004 is generating the database or indexes, it is not dead, just busy 😊

# Texture Configuration Utility

*Ultimate Terrain For MSFS* gives you a highly configurable set of night and day textures using the *Texture Configuration* application.

There are over 100 combinations of night lighting textures that can be used with the *Ultimate Terrain* series. These configurable night lighting elements include:

- ❖ The type of lighting (high pressure sodium, low pressure sodium, mercury vapour, FS2004 color match, or no lighting).
- ❖ The pavement reflectivity (bright, dim, or dark)
- ❖ The road traffic density (high, mixed, low, very low, or none).

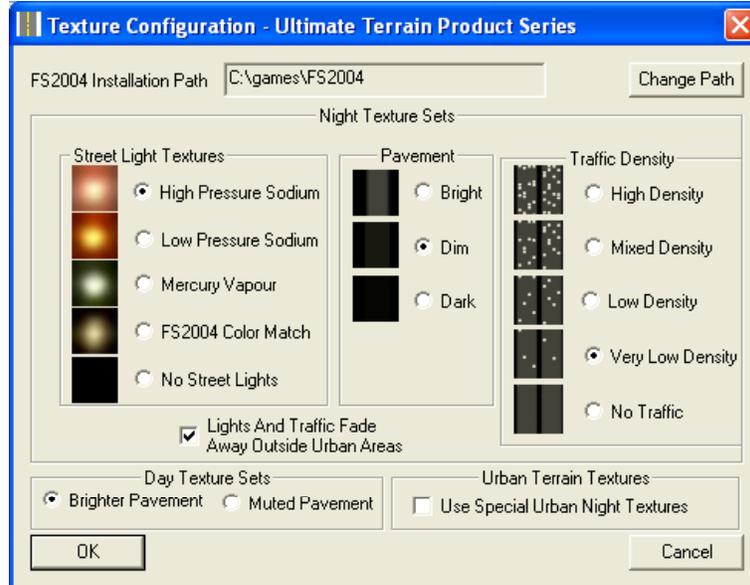
The new night textures provide for more accurate looking street-light effects. Also, the street lights taper away as you leave metropolitan areas and isolated cities (this feature can be turned on/off by the user).

In addition to the night textures, you are given the choice of two different day textures (one with brighter pavement and one darker pavement).

Figure 1-2 shows the *Texture Configuration* application for the *Ultimate Terrain* product series.

**Important Note:** The *Texture Configuration* application configures road textures for all *Ultimate Terrain* products, including North America and Europe.

Figure 1-2



## Night Texture Sets

Different users seem to have different tastes regarding night lighting in Flight Simulations. Because of this, Ultimate Terrain For MSFS includes over 100 different combinations of night lighting textures.

The configurable night lighting elements include:

- ❖ The type of lighting (high pressure sodium, low pressure sodium, mercury vapour, FS2004 color match, or no lighting).
- ❖ The pavement reflectivity (bright, dim, or dark)
- ❖ The simulated road traffic density (high, mixed, low, very low, or none).

The new night textures provide for more accurate looking street-light effects. Also, the street lights taper away as you leave metropolitan areas and isolated cities (this feature can be turned on/off by the user).

When you first install this product, the default settings are those that we feel is best for use with the enhanced night lighting. You can experiment and change them as you like.

### Select Installed Night Texture Set – 5 options

This setting will control the type of lights displayed in the Ultimate Terrain For MSFS night textures. There are 5 options.

A sample of each type of light is displayed in the setup window.

#### High Pressure Sodium

High pressure sodium lighting has a warm golden appearance and although not as efficient as low pressure sodium, it enables a range of colours to be seen comfortably. It is most likely to be seen in town centers and conservation areas. It is also more widely used for new lighting schemes, where it is appropriate and energy efficiency is not compromised.

#### Low Pressure Sodium

The low pressure sodium lamp is the most efficient light source and provides good lumen output with a low energy consumption. But, this type of light has the disadvantage of being monochromatic and emits only yellow light.

#### Mercury Vapour

This type produces a white light (with a slight green/blue tint). These lamps are inefficient and are generally being phased out in favor of low and high pressure sodium lamps.

#### FS2004 Color match

This setting causes the street lights in FS2004 to match the color of the rest of the night textures in FS2004. It is not really an accurate lighting mechanism, but will allow the roads to better match the existing textures in FS2004

#### No Street Lights

This setting will install night textures that have no street light glow build into them. This option might be preferable given the new night lighting environment in Ultimate Terrain For MSFS.

## Pavement

### Bright

The bright setting causes the roads to be easily seen from the air, regardless of the traffic density effects. This option has brighter, more condensed street lights. The pavement is also brighter. Most people would probably consider this option less realistic, but it provides a more striking rendition of the landscape.

### Dim

The dim setting would probably be considered a more realistic night-lighting option. The street lights are dimmer in general, but have a more realistic glow to them. The pavement reflection is also not as bright.

### Dark

The dark setting provides a very dark pavement reflection (almost invisible), which might be more preferable for some.

## Traffic Density – 5 options

This option simulates auto traffic in the ground textures. This makes the terrain appear to have an additional glow from automobile headlights or taillights.

### High Density

This setting gives the appearance of heavy road traffic at night.

### Mixed Density

This setting gives a more mixed amount of road traffic at night. High traffic in the urban areas, and low traffic outside urban areas.

### Low Density

This setting gives the appearance of lighter road traffic at night.

### Very Low Density

This setting gives the appearance of very light road traffic at night.

### No Traffic

No traffic at night. Might be preferable due to the enhanced 3D night lighting effects now available.

## Lights And Traffic Fade Away Outside Urban Areas – On/Off

If this box is checked, then the street lights will begin to fade away at a given distance from urban areas. Traffic and pavement reflection will still be visible.

If this box is not checked, then street lights will appear on all Ultimate Terrain For MSFS.

*Note: this setting affects the simulated 2D street lights embedded in the ground textures. It is not related to the new 3D enhanced lighting feature*

## Day Texture Sets

### Brighter Pavement

Selecting this option gives you the brighter road pavement textures that were distributed with the original USA Roads for FS2004 package.

### Muted Pavement

Based on user requests, this option will darken the road textures somewhat. This way they will blend in better with the terrain and give less of a map-like look.

## Urban Terrain Textures

### Use Special Urban Night Textures

If you turn on this option, Ultimate Terrain will replace the city landclass textures at night, with custom versions. The special textures use mip-mapping techniques that make the cities appear brighter in the distance, and dimmer up close. These textures generally look better with the enhanced night lighting functionality of Ultimate Terrain.

The Mip-Mapped textures may not be for everyone. If you see a slow flashing of the textures, or other visual anomaly, then you should disable this option.

## Other Products That Can Improve Your Experience

From a terrain enhancement standpoint, this package includes everything except a Terrain Mesh upgrade.

Terrain mesh upgrades will improve terrain elevations in hilly or mountainous areas.

Many people may want to invest in enhanced terrain mesh. A 76 meter terrain mesh package (created from 90 meter base) would work perfectly with the enhanced lighting provided by this software package, because the lights and some water bodies (lakes), are positioned according to 90m terrain mesh elevations.

There are already many commercial terrain mesh packages available currently for FS2004. Because of the quality and variety of these packages, we have no plans to add our own at this time.

# Things To Be Aware Of !

To avoid confusion, here are some things that you need to be aware of:

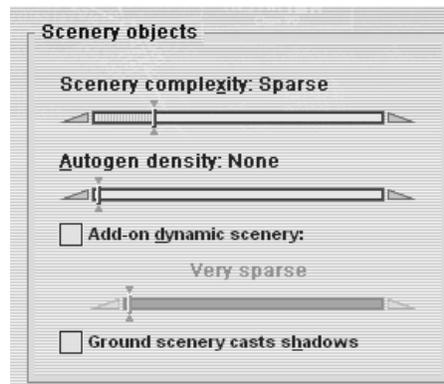
## Shared Textures

The Ultimate Terrain series products will include the USA, Canada, Europe, and eventually other areas. Each one of these products will share the same set of ground textures in FS2004. Therefore, changes made using the *Texture Configuration* utility, which is included with *Ultimate Terrain For MSFS*, will also affect the set of textures shared by all similar products (including the current USA Roads product).

## Using The Scenery Complexity Slider For Enhanced Night Lighting

The scenery complexity slider in FS2004 controls the quantity of scenery objects that are displayed in FS2004.

You can display the scenery complexity slider in F2004 by selecting the following menus: Options -> Settings -> Display.



The enhanced night lighting in *Ultimate Terrain For MSFS* has been programmed to display when the FS2004 scenery complexity slider is set to at least the "Sparse" setting. This setting will add enhanced night lighting to cities only.

To add night lighting to both cities and rural areas (farms and auto lights), change the setting to at least "Normal"

If you do not see any enhanced night lights, check this setting. The Scenery complexity slider can be changed in FS2004 during flight.

## Frame Rates

There are six types of scenery objects included in *Ultimate Terrain For MSFS*:

- ❖ Roads
- ❖ Railroads
- ❖ Water areas (drawn as polygons)
- ❖ Enhanced Night Light objects
- ❖ Landclass data.
- ❖ Detailed ground polygons.

All of the above are part of the FS2004 terrain system, with the exception of the Enhanced Night Lights, which are 3D objects (consisting of a single point of light).

As you have already seen in the Scenery Solutions *USA Roads for FS2004* product, the roads have a very little or no impact on frame rates. This is also true with railroads, enhanced water areas, and detailed ground polygons.

The enhanced landclass data will have absolutely no impact on frame rates

Other types of scenery in FS2004 involve the display and management of 3-dimensional objects such as: Aircraft, buildings, and other 3D objects. The more objects that are displayed at once in FS2004, the more impact there is on frame rates. Some users, with high end systems, seem to be able to put all the FS2004 sliders to maximum and still be able to fly without any stuttering or slow downs.

As you probably know, adding a significant amount of Autogen in FS2004 can really drag down most computer systems.

The enhanced night lighting in *Ultimate Terrain For MSFS* will provide some stunning night flying effects. We have tried to optimize this process as much as possible, to have a minimal effect on frame rates.

In dense urban areas, like Toronto, there can be thousands of tiny light scenery objects displayed at once. On lower end systems, or systems that are already inundated with a lot of add-on scenery, you might notice some slowdowns in the very dense urban areas.

Overall, we think most people will be very satisfied with the frame rate impact. The impact of the Enhanced Night Lighting seems to be much less than the moderate or denser autogen settings in FS2004.

If you want to help improve frame rates at night, try reducing or eliminating Autogen. Most autogen objects cannot be seen very well at night anyway.

## Creating Your Own Textures

We have provided many different texture combinations. However, creative users may want to provide their own night textures (or day textures for that matter).

We will not attempt to teach this process. However, we will list the textures used by Ultimate Terrain For MSFS for those that are interested in changing them. You can view the list in Appendix B.

For support on creating your own textures, you should try the forums at popular flight simulator websites such as avsim.com or flightsim.com. There are many other good sites also.

*Important Note: If you replace the Ultimate Terrain For MSFS textures with your own in FS2004, make sure that you have a backup copy of your textures. If you run the Texture Configurator and change the settings, your custom textures will be copied over.*

Neither Flight One Software nor Scenery Solutions is responsible for possible mistakes made by customizing FS2004 textures. This includes both textures included with FS2004, and textures provided in the Ultimate Terrain For MSFS enhancement.

# Appendix A: FAQ

## Roads And Rails

### Will I be able to find my street if I purchase Ultimate Terrain For MSFS ?

The roads used in Ultimate Terrain For MSFS come from commercially licensed source data from Navteq ([www.navteq.com](http://www.navteq.com)). Navteq releases data update 4 times a year. This source data is probably the most up-to-date source of road data in the industry. Unless you live on a brand new street, yours should be included. However, no data is 100% accurate. The world is just too big of a place for that.

### How well will Ultimate Terrain For MSFS interact with airports and other buildings in FS2004 ?

Autogen in FS2004 will work very well with the roads supplied in Ultimate Terrain For MSFS. Autogen objects will be positioned around the roads. In general, the airports in FS2004 are positioned fairly accurately and will work well with Ultimate Terrain For MSFS. Custom objects in FS2004, such as downtown buildings and stadiums, may sit on top of roads if they are not positioned in FS2004 according to their real-life locations. In many cases, buildings in FS2004 appear to be positioned relative to the original roads provided by FS2004, which are not usually very accurate.

### How well will the Roads interact with other FS2004 scenery packages ?

Ultimate Terrain For MSFS should work with all terrain elevation scenery upgrades. Custom scenery packages using custom terrain textures (such as Megascenery and other aerial photography) will probably overlay Ultimate Terrain For MSFS in the shared region. Other packages that contain custom objects, such as buildings, will work very nicely with Ultimate Terrain For MSFS if they have been positioned correctly at their actual real-life coordinates. Any product that improves the accuracy of terrain and objects in FS2004 should also benefit Ultimate Terrain For MSFS.

### Can I replace the roads textures with my own, or one of the available freeware versions ?

The freeware road replacement textures floating around the internet will not work as is if they are designed for the base FS2004 roads. The roads in Ultimate Terrain For MSFS have their own texture sets (a much wider variety).

### How do the FS2004 bridges line up with the new roads ?

The bridges in FS2004 have been positioned to work with the original roads included in FS2004. The FS2004 roads are generally not positioned very accurately. Because of this, the more accurate *Ultimate Terrain For MSFS* may not align with the bridge objects. It is quite common for the roads that come with FS2004 to be off by over 1000 feet.

The Ultimate Terrain setup utility gives you the option of turning off autogen bridges, but not statically placed bridges.

## Some buildings are now positioned on top of roads

Roads in *Ultimate Terrain For MSFS* are positioned very accurately, but some static objects in FS2004 appear to have been positioned relative to the roads included in FS2004. Therefore, there is a chance that some of them might be positioned on top of a road.

On the other hand, autogen works just fine with Ultimate Terrain For MSFS. Autogen buildings and objects are positioned around the roads in FS2004. Also, airports and airport buildings in FS2004 are generally more accurate and seem to work well with Ultimate Terrain For MSFS.

## The streets look blurry at a distance.

If the streets are blurry, then the ground textures will also be blurry. There have been many articles written about blurry textures in FS2004, and ways to improve them. The best place to get help on correcting blurry ground textures, are probably Flight Simulation forums available at sites such as Avsim.com or Flightsim.com.

## Some smaller roads appear washed out at the ends

This is due to the way FS2004 draws its roads, and it is due to the chosen road widths used by Scenery Solutions.

We wanted to choose road widths that would most likely reflect the actual sizes in reality. But, we also wanted them to blend in as well as possible with the FS2004 background textures.

FS2004 does not handle line/road widths very well that are reasonably narrow. On the other hand, if we increase the size of the line widths, the roads look too “grid-like” and do not blend in as well with the background. Also, we stand the chance of having parallel, divided roads that overlay each other, due to the artificial enlargement.

We chose road line widths that hopefully achieve the greatest balance. Occasionally, a road might appear to be drawn too “thin” for your liking. However, very few roads appear to be affected in this manner.

## Night Lighting FAQ

### Will the night lighting work with photo terrain packages like Megascenery ?

Custom terrain textures (i.e. photographic images), will overlay other terrain objects in FS2004 (like roads, water, etc). However, the enhanced night lighting features of this software are NOT terrain based objects and therefore should work terrific with these products.

### In certain places, some lights seem too elevated?

We based the light point elevations on a 90-meter mesh terrain. FS2004's default terrain resolution is much less accurate than that.

Because of the popularity of add-on Terrain Mesh upgrades (including 90-meter mesh, often sold as 76m mesh), we decided to position the lights on a very good case mesh, rather than the default mesh.

In general, this will not cause much visual anomaly. However, areas like small hills, which do not show up with the default FS2004 mesh, may cause some lights to form a small hill-like pattern due the 90-meter mesh that we based the product on.

If you see a light or lights several hundred feet in the air, we would like to know about them.

### When I fly up to a night light, it sometimes turns off ?

For an object to be displayed in FS2004, the entire object must be visible in the display area. Each of our night lights is not a separate object. For performance reasons, we create groups of light objects.

If you are too close to the ground, or zoomed in too much, then it some of the light lights might turn off as you visually approach the group.

## Enhanced Water FAQ

### Now that the water is corrected, what happens to the FS2004 bridges ?

Now that the water is corrected, you may find that some FS2004 bridge objects are badly misplaced, because they have been positioned over the default FS2004 water areas, which are not accurate in most cases.

Autogen bridges can be disabled by using the Ultimate Terrain Setup Utility. Static object removal will be addressed in the future.

### Now that the water is corrected, a couple of city buildings are in the water ?

Similar to the bridge problem above, you may now find a few buildings in the water, because the downtown areas of major cities in FS2004 have been incorrectly placed.

Scenery Solutions hopes to provide a fix for city building objects in the future.

You will not find autogen buildings in the water ! The problem above only affects static buildings that have been incorrectly positioned.

### Will Ultimate Terrain Add More Hydrology Features Than FS2004?

Our goal is to acquire the best data available, this includes water. Our water features will always be more detailed than the default in FS2004. In many cases, the difference will be staggering.

### Will the new coastlines expose missing landclass data in FS2004 ?

No. Our landclass data includes patches to the FS2004 shoreline areas, to prevent "holes" in the landscape caused by missing FS2004 landclass data.

Microsoft only includes enough base landclass data for their included shorelines. Since the shorelines have been reworked in this product, we had to add additional landclass data to the extended shoreline areas.

### Will your water run up the side of mountains, like some others ?

In most cases, no. Objects classified as lakes, will be flattened based on DEM (elevation data). Oceans and oceanic bays are flattened at sea-level.

Rivers will hug the terrain. If an item is classified as a river, it may run up the hill due to inaccurate terrain mesh, or if the river is not positioned precisely (in the data set).

### Will your water bodies have coastlines ?

Coastlines are textured lines in FS2004, that provide a more gradual buffer between land and water areas. We draw coastlines for all but the smallest islands, lakes, and rivers (all rivers have no coastlines). We do not draw coastlines on the small objects and rivers, because they generally look better without them. Coastlines greatly improve the look of all other objects.

## Enhanced Landclass FAQ

Your landclass is nice, but I want to use my own. Are they compatible ?

You can disable any part of this scenery package using the included setup utility. This includes our landclass data.

Some areas of our landclass contain pass-thru values, which will allow the landclass with the next highest priority in the FS2004 Scenery Library to be displayed (see Appendix C – The FS2004 Scenery Library).

## Detailed Land Polygon FAQ

Will my city park or local golf course be visible ?

Every park, golf course, and cemetery that is part of Navteq's premium data set is included in the package. If Navteq has mapped the location, it should appear in FS2004.

## Appendix B – Visual Artifacts And Anomalies

In the FS2004 world, some people use the terms anomaly or artifact to describe negative visual issues present in one's terrain scenery.

When developing a terrain product for FS2004, the developer has to deal with a variety of factors which can make the job difficult. Things like....

- Misplaced base FS2004 features (airports, water, etc)
- Bad FS2004 elevation data
- Erroneous data in 3<sup>rd</sup> party products.
- 3<sup>rd</sup> party compatibility issues.
- And of course, developer mistakes.

The only way to create the near-perfect terrain environment, is to create the scenery manually, test it, and repeat the process until it is perfect.

Each product in the Ultimate Terrain series covers a very large territory. The area and features are so large, that it is impractical for any developer, commercial or freeware, to use manual design methods to achieve the task of creating scenery.

We worked 9 months in developing and tweaking software tools that will allow us to generate FS2004 terrain scenery using automation techniques (mostly), for large coverage areas, with a very minimal amount of visual artifacts or anomalies.

Each Ultimate Terrain series product is put through a fairly extensive test period, with feedback from at least 10-15 beta testers. Even with all this testing, you can expect to see what might be viewed as an occasional "glitch" in the terrain scenery. Plain and simple, our coverage areas are too large to test out each area extensively.

We have to rely on the quality of our development software and the quality of the commercial data. Also, the placement of various base FS2004 features, and how they interact with Ultimate Terrain, will also contribute to the overall visual effect.

Some airports in FS2004 are badly misplaced. For some of the more popular airports, we have modified the water boundaries to work with this misplacement. However, we would generally not want to sacrifice accuracy of our product, to circumvent the inaccuracies in FS2004.

That being said, we think our quality control is some of the best in the business, and that you will be very happy with your purchase.

You can help, by reporting any visual anomalies to our Ultimate Terrain forum named "*User Requests And Reporting*" at [www.simforums.com](http://www.simforums.com).

Please read the forum announcement for instructions on how to post the reports, and what should be reported.

Do not expect feedback from Scenery Solutions or Flight One in this particular forum. However, we will compile the list of requests and use them to implement changes in any future patches or versions that will be released.

There are a few situations that we already know about, but there is no logical way to correct them due to FS2004 constraints.

Here are a few of them.

## Water “Bumps” Around An Airport

In some cases, the FS2004 airport regions are not positioned well.

If a FS2004 airport “hangs out” over Ultimate Terrain’s water, then you may see a situation similar to the one pictured below:



In this example, the lake is flattened at one elevation. At the same time, the FS2004 airport boundaries are flattened at another elevation (probably incorrect).

For some airports, we have moved the water around to prevent this situation. In general though, we would rather keep the water placed accurately, in case an airport is improved at a later time.

Feel free to let us know about this issue. If we can make the situation look better, without greatly reducing the accuracy, we will do it.

## Bad FS2004 Elevation Data Causing “Volcano Lakes”

The image below is not a common one (thankfully), but it does happen.



We all know that the mesh (elevation data) in FS2004 is not very precise (1km precision). However, FS2004 also appears to have errors in the elevation data.

In the image above, the elevation data in FS2004 is about 800 feet below what it should be. When the lakes are flattened in Ultimate Terrain at a more appropriate height, it causes them to stick out too high. In reality, it is the FS2004 elevation data that is too low.

We have seen other 1km elevation data sets that show the heights correctly, so this appears to be a problem isolated to FS2004 (and not a result of 1km mesh being used).

The only way to improve the situation above, is to purchase a better mesh product for FS2004. Again, the situation above is not common. It seems to only exist in isolated pockets in FS2004.

## Water Between Land and Coastline.

Here is another problem, which also appears in the base FS2004 scenery



On occasion, you may see what looks like puddles of water between the texture and land areas. This is a known problem in FS2004. You will see it with the default/base FS2004 scenery, but is more pronounced when scenery is more detailed (like Ultimate Terrain). We have adjusted the textures slightly to reduce this annoyance. However, you will still see occasional occurrences of this situation. We do not need to know about these, as there is nothing more we can do about it at this time.

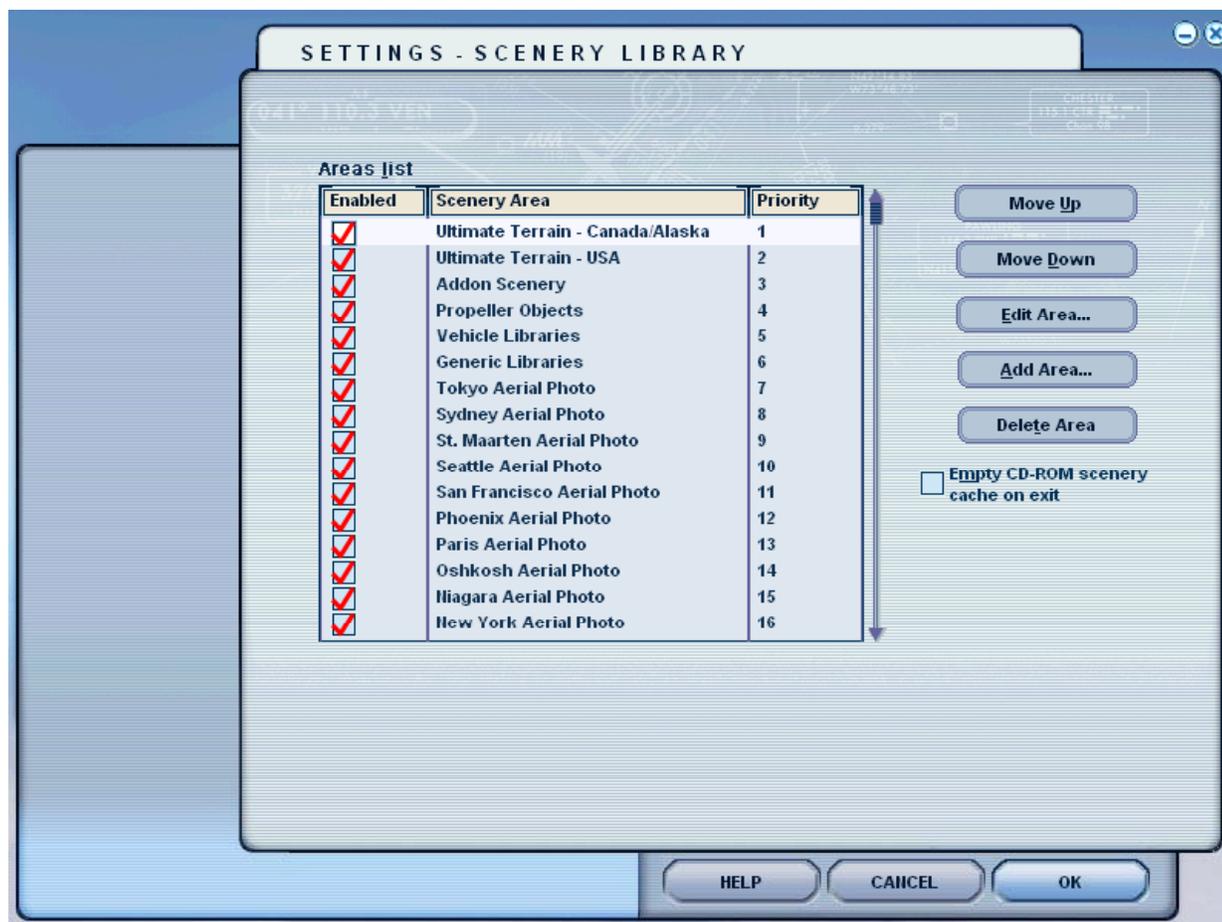
## Appendix C – The FS2004 Scenery Library

FS2004 uses a priority layering system to display scenery. The scenery layers are defined in the FS2004 SCENERY.CFG file, and can be adjusted within FS2004 using the Scenery Library feature.

Many scenery items like roads and 3D objects, will overlap regardless of their position in the scenery library. On the other hand, FS2004 will rely on this ordering to determine what gets displayed for things like landclass upgrade packages.

Since Ultimate Terrain contains a landclass upgrade, you should be aware of this.

If you select the “Scenery Library” from the “Settings” menu item, you will see something similar to the following.



As long as Ultimate Terrain is above other landclass packages, it's landclass should take priority over any others. Since our landclass also contains some “pass-thru” values outside the cities, the landclass with the next highest priority should be used by FS2004 to fill in these areas. If there are no other 3<sup>rd</sup> party landclass products installed, then the default landclass will be used.

If you purchased only the Canada/Alaska product, then you are probably wondering why Ultimate Terrain – USA is installed.

“Ultimate Terrain –Canada/Alaska” includes a small portion of the USA border regions to completely fill out the FS2004 LOD 5 cells (all FS2004 scenery is released on LOD5 boundaries of 3.75 degrees longitude by 2.81 degrees latitude). If you purchase the full “Ultimate Terrain – USA” package later on, it will replace the small fill-in area.

## Appendix D - Texture List

The following is a list of custom textures used by “*Ultimate Terrain For MSFS For Microsoft Flight Simulator*”.

To find the textures on your hard drive, look in the FS2004 “SCENERY\WORLD\TEXTURE” folder. The FS2004 folder is the directory containing the FS9.EXE executable for FS2004.

### Day textures

Bitmap Filename	Surface	Location	Traffic Density	Description of Use Road Classification
aRoad2wh.bmp	Asphalt	Urban	High	Divided highways with limited access.
aRoad2wm.bmp	Asphalt	Rural	Low	Divided highways with limited access.
cRoad1nh.bmp	Concrete	Urban	High	All minor roads
cRoad1nl.bmp	Concrete	Rural	Low	All minor roads
cRoad2wh.bmp	Concrete	Urban	High	Divided highways with non-limited access. Divided major roads.
cRoad2wm.bmp	Concrete	Rural	Low	Divided highways with non-limited access. Divided major roads.
cRoad2yh.bmp	Concrete	Urban	High	Undivided, major roads.
cRoad2ym.bmp	Concrete	Rural	Low	Undivided, major roads
cRoad4bh.bmp	Concrete	Urban	High	All undivided highways.
cRoad4bm.bmp	Concrete	Rural	Low	All undivided highways.

### Night Textures

Bitmap Filename	Location	Traffic Density	Description of Use Road Classification
nroad1cl.bmp	Urban	High	Minor roads
nroad1rl.bmp	Rural	Low	Minor roads
nroad2ch.bmp	Urban	High	All major roads and divided highways.
nroad2rm.bmp	Rural	Low	All major roads and divided highways.
nroad4cm.bmp	Urban	High	Undivided highways
nroad4rm.bmp	Rural	Low	Undivided highways

## Seasonal Textures – placed beneath divided highways and railroads

Bitmap Filename	Time-of-day and season
FaUnder.bmp	Day-Fall
HwUnder.bmp	Day-Hard Winter
LmUnder.bmp	Night-All
SpUnder.bmp	Day-Spring
SuUnder.bmp	Day-Summer
WiUnder.bmp	Day-Winter

## Coastline Textures

Bitmap Filename	Time-of-day and season
UTRockSu.bmp	Rocky, non-winter texture used for lake coasts.
UTRockLm.bmp	Rocky, non-winter, night texture used for lake coasts.
UTRockHw.bmp	Rocky, winter texture used for lake coasts.
UTSandSu.bmp	Sandy, non-winter texture used for ocean coasts.
UTSandLm.bmp	Sandy, non-winter, night texture used for ocean coasts.
UTSandHw.bmp	Sandy, winter texture used for ocean coasts.

## Appendix E – BGL File Naming Convention

All Ultimate Terrain FS2004 scenery files (BGL Files) are released on LOD5 or LOD8 boundaries.

LOD5 boundaries cover a much larger areas. For performance reasons, we might break some of the larger LOD5 regions, with lots of data, into smaller LOD8 files (there are 64 LOD8 cells per LOD5 region).

Here is a list of BGL file prefixes used in the Ultimate Terrain product. The file prefix consists of the first or first two characters in the filename. The rest of the filename represents the LOD5 or LOD8 cell containing the information.

<i>Prefix</i>	<i>Description</i>
<i>FL</i>	<i>Road Flattening</i>
<i>HL</i>	<i>Coastlines</i>
<i>HP</i>	<i>Water Polygons</i>
<i>L</i>	<i>Enhanced Night Lighting</i>
<i>LC</i>	<i>Enhanced Landclass</i>
<i>PK</i>	<i>Detailed land polygons (i.e. parks, golf courses, cemeteries)</i>
<i>RA</i>	<i>All Road Types</i>
<i>RM</i>	<i>Major roads and highways only</i>
<i>RR</i>	<i>Railroads</i>

# Appendix F – Improving FS2004 Performance

## Things You Can Do To Improve Performance

### Defrag Your Hard Drive

There are thousands of scenery files in FS2004. In order to speed up FS2004 load times, many users have recommended using the Windows Disk Defragmenter, or Defrag for short after installing new FS2004 products.

Disk Defragmenter consolidates fragmented files and folders on your computer's hard disk, so that each occupies a single, contiguous space on the volume. As a result, your system can gain access to your files and folders and save new ones more efficiently

For more information, check your Window's help file for Disk Defragmenter or Defrag.

### Hardware Upgrades

Among other things of smaller nature, CPU speed, video card performance, memory speed and availability and hard disk speed all effect FS2004 performance.

These are our recommendations only. We are not experts, nor responsible for expected or unexpected results caused by our suggestions.

**CPU Speed** – Because of the size of the world in FS2004, FS2004 is very CPU intensive. All those objects you see on the screen must be managed efficiently by the processor, even if they are not currently being displayed. Upgrading the CPU may be the most beneficial upgrade for running FS2004.

**Video Card Performance** – The better the video card, the better the display performance and quality in FS2004. However, it makes no sense to get a top of the line video card, if you have a bottom of the line CPU. Some video cards will yield little or no performance difference, if the processor cannot keep up with it.

**Memory** – The computer's memory is a much faster storage mechanism than it's hard drive. Adding lots of 3<sup>rd</sup> party upgrades to FS2004 can increase the memory requirements. If FS2004 requires more memory than currently available, it will begin to use the Window's swap file (page file). Since the page file is stored on the hard disk, which provides slower throughput than computer memory, excessive page file use will slow down FS2004 performance and increase load times.

**Hard Drive Performance** – This upgrade is often overlooked. A faster hard drive will provide faster scenery load times. This is especially important when the Window's swap file (page file) is used heavily.

### Within FS2004

Here are just a few of the many possible suggestions....

**Reduce Autogen** – Autogen can drastically reduce machine performance, especially if the when the Autogen Complexity slider in FS2004 is set to a dense setting or higher. An autogen setting of Normal will usually give a nice tradeoff between performance and detail.

**Increase Zoom Level** – The further you are zoomed in within FS2004, the better the frame rates. The higher the zoom level, the fewer the number of objects that have to be displayed on the screen.

# Appendix G: Expected FS2004 Performance With Ultimate Terrain For MSFS

We have spent many hours making this product as efficient as possible, without sacrificing visual quality. Unfortunately, just about every enhancement to FS2004 will cause some slowdown, or require hardware upgrade(s) to keep up the expected performance.

With our USA Roads product, most people saw no noticeable decrease in framerates or system performance.

One of the most common comments regarding FS add-ons is “My FS2004 performance was fine, until I installed this product”.

While the statement may be true, the cause of the problem may have to do with something else you have installed previously.

One example might be swap file (page file) usage. When Windows has to rely on using the swap file frequently, things can slow down significantly.

You may have a product that is eating up a majority of your available RAM. Then, you install a new product which uses only a little RAM, but the additional amount is enough to force the system to begin using the swap file extensively. It would be easy to assume that the last installed product is causing the excessive memory use. However, would not be the case in this example.

This is just something to keep in mind when installing FS2004 upgrades.

Here is a very basic table, showing ROUGH estimations of the impact of various Ultimate Terrain For MSFS features on FS2004 over the basic FS2004 features. These statements come from our internal testing, and may not represent your actual performance. Performance will vary in different areas. Generally, performance will be less in high-density metropolitan areas.

Performance is also generally less in hilly or mountainous regions. This is especially true when enhanced terrain mesh packages are installed.

Each one of these features can be toggled on and off using the Ultimate Terrain Setup utility.

<b><u>Feature</u></b>	<b><u>Frame Rate Reduction</u></b>	<b><u>RAM Usage</u></b>
Enhanced Roads	Very little or none	Very Little to Moderate
Road Flattening	Very little or none	Very little
Enhanced Rail	Very little or none	Very little
Enhanced Water	Very little or none	Very little
Detailed Land Polygons	Very little or none	Very little
Enhanced Lighting	Very Little to Moderate	Very little
Enhanced Landclass	None	None

## Appendix H: Acknowledgements

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