

REVIEW

The second booklet contains copies of 234 airport diagrams and approach charts for all airports in the scenery area. Thus, the package includes complete flight documentation for VFR and IFR simulator pilots, except for the applicable IFR enroute charts. The approach charts booklet is very complete, though it would be helpful to include an index. Additionally, note that all Standard Terminal Arrival Route (STAR) charts are found in the beginning of the booklet, while the Departure Procedure (DP) charts are located with the related airports.

The Lite version includes only the scenery CDs and installation and VFR lessons manual, without the sectional, terminal, and approach charts. The difference in package price is \$10 US, and the two large charts alone, if purchased separately, would cost more. Clearly the Full version is much better value.

This version of MegaScenery is enhanced from previous versions, as it includes:

- Improved night scenery.
- Smart installer – automatically installs for either or both FS2002 and FS2004.
- High resolution 30-meter terrain elevation mesh – for more realistic mountains.
- Repositioning of incorrectly placed FS2004 default objects.
- Miscellaneous other tweaks and enhancements.

Installation

Installation is straightforward, and to pass the time, you'll see the Scenery Tips slideshow while you wait. The installation takes a significant amount of time, because more than 200,000 files are copied to your hard drive! On my 3.0 GHz system, it took about 30 minutes. The installation routine will offer to make all recommended changes in configuration settings, though I recommend comparing your settings with the Scenery Tips slides after installation to ensure that all recommended settings were made.

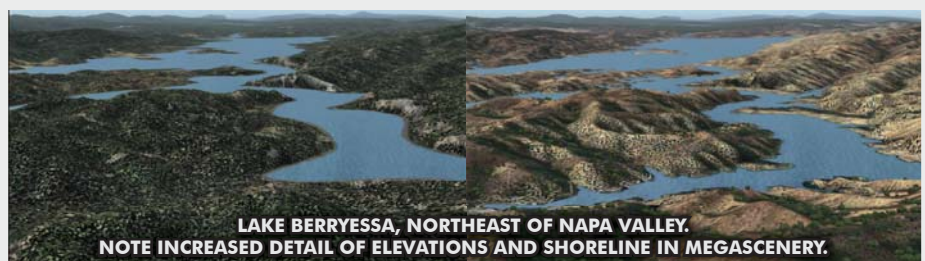
Daytime Scenery Comparisons

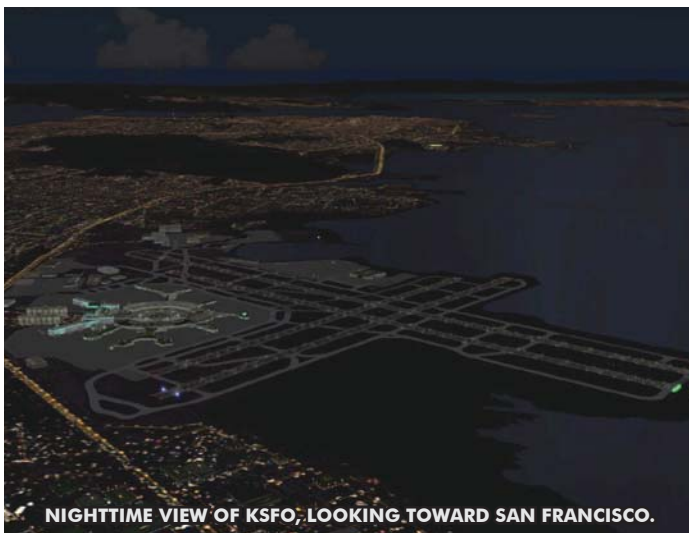
As is customary in scenery reviews, here are comparative screenshots from FS2004, with and without MegaScenery Northern California. Although you cannot see the frame rate counter in each image, the numbers were all above 30 fps, except near KSFO with full AI traffic. All shots were taken from 4000 feet MSL, with a slight downward angle.

In the last screenshot on the right, turning off my installed Ultimate Traffic AI aircraft boosted my frame rate from about 9.0 to 40 fps, so AI traffic has a significantly greater impact on frame rates than MegaScenery. In fact, once fully loaded, frame rates using Megascenery can often be better than when using the default scenery tiles.

FS2004 DEFAULT SCENERY

MEGASCENERY NC IN FS2004





Nighttime Scenery

As you'll see in the accompanying interview with MegaScenery developer Andrew McLean, significant work is done to make night scenery textures, which are an impressive part of the package. It's difficult to capture the beauty of the night textures with printed screenshots, but take a look at the included pictures and try placing your aircraft in the same positions. Note that these images have been edited slightly to brighten them up for print so they are more easily visible.

Seasonal Textures

With the first MegaScenery package you needed to fly the scenery with the Season set to summer only. Otherwise, the scenery simply didn't appear. In the Northern California version, you can fly in any season, though seasonal changes are not depicted, because the textures are all taken from the same satellite photos. Instead, four identical textures are used for each of the four seasons. Thus the characteristic seasonal look of green fields, hills, and mountains in the winter and "golden" in the summer are not present. It's tempting to call this a shortcoming of the package, but at the price, the package is very impressive without true seasonal textures. Including all four seasons would also require four times the hard disk space, and probably 12 installation CDs!

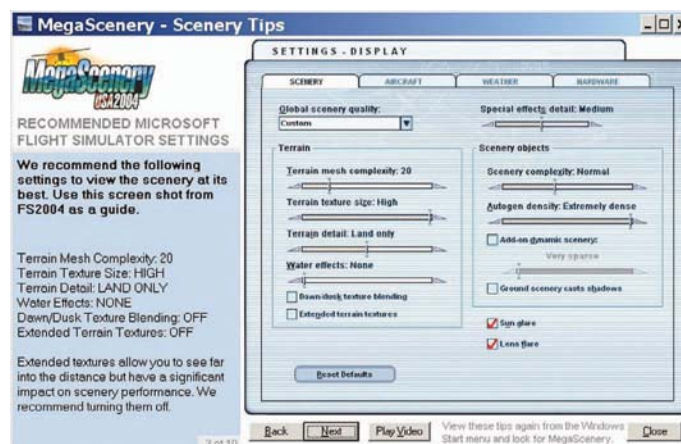
Performance

The initial scenery loading time of the sim is clearly longer with MegaScenery. But it's worth the wait, and what really counts – frame rate – is surprisingly good. I've run the MegaScenery on both older and new computer systems and I get excellent performance with my newer Intel 3.0 GHz system, but I get surprisingly good performance on my older Athlon 1200 system. With AI traffic installed and set at 50% I was still able to achieve greater than 20 fps with my older system. There are no visible texture seams, and loading is entirely smooth without scenery voids or frame rate stutters. However, note again that AI traffic density has a huge effect on frame rates, with or without MegaScenery.

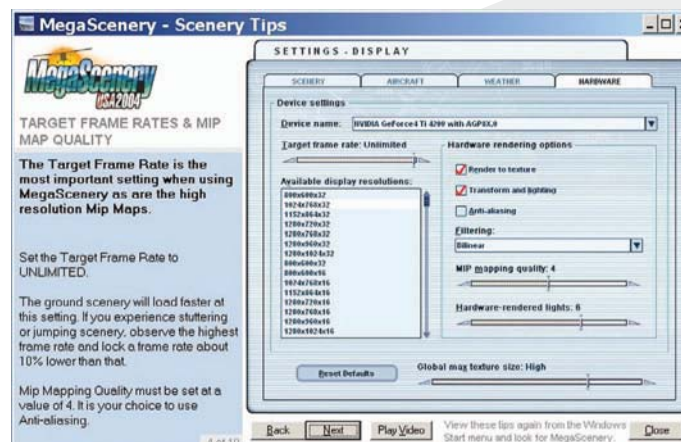
Settings

As with earlier versions, MegaScenery users will notice that their fs2002.cfg or fs9.cfg file is modified by the MegaScenery installation program, to change display and configuration settings. The new settings are fully explained in the Scenery Tips show that

runs during installation. By the way, this informative program can be re-run anytime from Windows **Start > Programs > MegaScenery > Northern California > Scenery Tips**. Here are some of the Scenery Tips slides showing recommended settings:



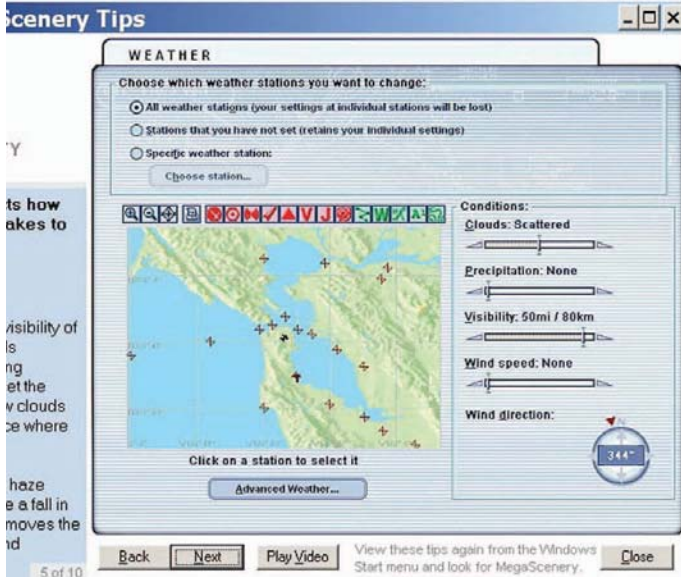
SCENERY TIPS SCREEN SHOWING RECOMMENDED SCENERY DISPLAY SETTINGS.



SCENERY TIPS SCREEN SHOWING RECOMMENDED VIDEO HARDWARE DISPLAY SETTINGS.

REVIEW

I asked Megascenery developer Andrew McLean about setting the target frame rate to Unlimited, because many of us have believed that with lower settings, MSFS would use only as much CPU power as needed, using the “extra” CPU capacity for other flight simulator tasks. Instead, Andrew reports that his extensive testing shows that setting a lower frame rate actually slows down the loading of the scenery tiles, while the Unlimited frame rate setting allows the tiles to load much faster.



SCENERY TIPS SCREEN SHOWING RECOMMENDED WEATHER SETTINGS.



SCENERY TIPS SCREEN SHOWING RECOMMENDED SETTINGS FOR NVIDIA AND ATI DISPLAY CARDS.

Summary

This is a great product, and it takes only a few comparative screenshots, such as those presented above, to see the amazing difference between default scenery and MegaScenery. In the following interview, developer Andrew McLean explains how MegaScenery is produced. I'll certainly be looking forward to the next MegaScenery package!

MEGASCENERY

How It's Made

An interview with the developer of Megascenery, and founder of Aerosoft Australia, Andrew McLean.



MEGASCENERY DEVELOPER - ANDREW MCLEAN OF SYDNEY, AUSTRALIA.

CP: Andrew, it's good to chat with you (electronically), and before continuing our interview, please tell our readers about yourself.

AM: I live in Sydney, Australia, and I describe myself as a self-taught computer programmer, beginning with a TRS-80 as my first computer. When I was 15, I programmed the game Space Invaders in Z80 assembly language. From that point on, my interest in flying increased and I merged my interest in flying and computers into flight simulation. As a real private pilot, I saw the need for a simple NDB/VOR intercept trainer and I wrote software to help pilots practice their training. I also wrote software to make computer-generated terrain for Terminal Reality's Fly! In 1998, I almost took a job with TRI in Dallas, but I decided to stay in Australia and concentrate on other software projects and continue development of my simulation business. In 1999, I released the full size Piper Arrow cockpit hardware, which was followed a few years later by the Boeing 747 Mode Control Panel and EFIS/EICAS hardware. A realistic Primary Flight Display and a Navigation Display, running under OpenGL, are almost finished. However, the MegaScenery project takes precedence, and creating new areas for MegaScenery will be my main interest for the foreseeable future.

CP: How does MegaScenery Northern California differ from MSFS default scenery?

AM: In simple terms, MegaScenery replaces the default FS2004 "land class" scenery textures with a photo-based solution. However, it also adds more than just daytime scenery, as it also includes realistic nighttime scenery, auto-gen buildings, high resolution elevation mesh and in some cases, winter scenery.

MegaScenery for MSFS is the culmination of a number of different data sources and about eight different software applications developed in-house – all brought together to produce a realistic flying environment. Production of MegaScenery is an involved process. Some work is done by hand, our custom software does some, and additionally, some work is done by users' computers.

The scenery is based on satellite photographic data that arrives at our office as large image files on a number of DVDs. In the latest release, MegaScenery Northern California, over 38,000 square miles of satellite images were provided to us, occupying around 15 gigabytes of hard disk space.

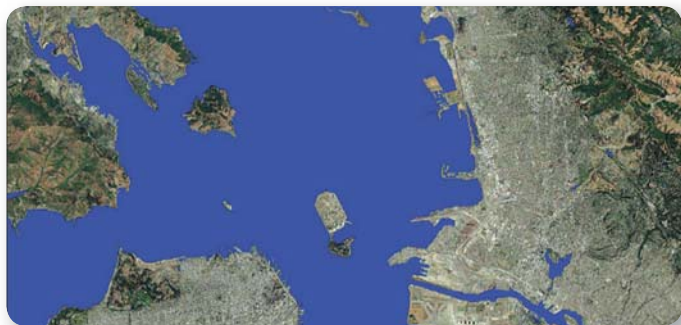
CP: Where does your scenery design process begin?

AM: The first stage of production involves organizing the large images into manageable chunks. MegaScenery NC starts as 27 bitmaps, each around 293 megabytes in size. At this point we hunt down problems with color, satellite photo scratches, and other image anomalies. Generally, all of the areas are color corrected with an increase in brightness and contrast, as well as gamma and some hue shifts. We also apply an “unsharp mask” to enhance the apparent sharpness of the images. All 27 pieces are manually examined and improved, which is a time consuming process. Typically, each image is over 8000 pixels wide and 11000 pixels high, so we work on quite large areas.

We try to reach a compromise between the color of flying in clear conditions and limited visibility conditions. FS2004 washes the scenery with a blue haze when flying with limited visibility, which makes the scene very realistic. With clear visibility, the scenery is much sharper and the colors more dense. Personally, we prefer flying with a visibility of about 50 miles for the greatest visual effect.

CP: It’s beginning to sound complicated, but mostly understandable. What’s next?

AM: Once the large images are ready, we build the “water mask.” We effectively cut out all of the water in the image by hand including lakes, rivers and the coastline. When loaded into FS2004, the cut out areas are replaced with FS2004’s own water. The water mask is important because it allows seaplanes to land and FS2004 water texture effects to be viewed by the pilot. It also gives a clean, defined outline to the land for navigation purposes.

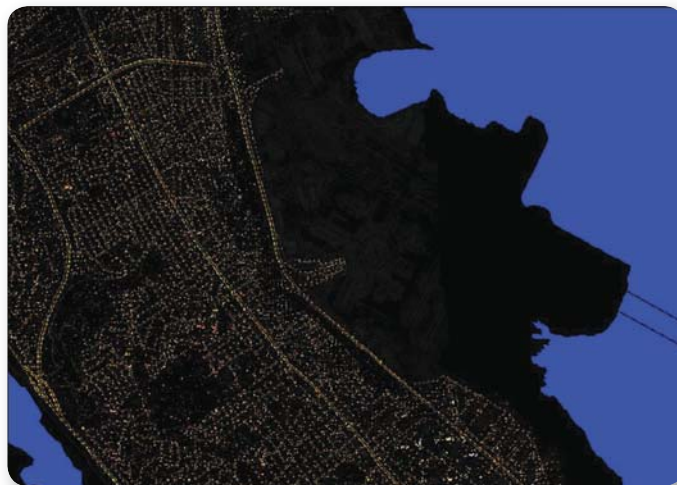


WATER MASK FOR SAN FRANCISCO.

At this point, we have the large color-corrected images and the water mask bitmaps. These are sliced into hundreds of thousands of small 256x256 pixel bitmaps. These small bitmaps are almost ready for FS2004 and undergo one more process: they are converted from a standard windows BMP format into a DXT file type for use in FS2004. This is a special format that contains seven different sizes of the same image, each one smaller than the previous – also known as “MIP mapping.” FS2004 uses these smaller images near the horizon to give the illusion of distance. We use a proprietary DXT compression technique to maintain the best possible quality of the images through each level. At this point in production the daytime scenery is now complete and ready for importing and displaying in FS2004.

CP: What about night scenery and seasons?

AM: No image data exists for night or seasonal scenery. We only have daytime satellite images, so we must be creative. Nighttime scenery is generated by one of our custom computer programs which draws roads and major city areas for night flying. This process generally takes at least one PC about six days running non-stop. Around 15 gigabytes of nighttime images are generated, and like the daytime process, these are sliced into thousands of images.



GENERATION OF NIGHTTIME SCENE WITH WATER MASK.

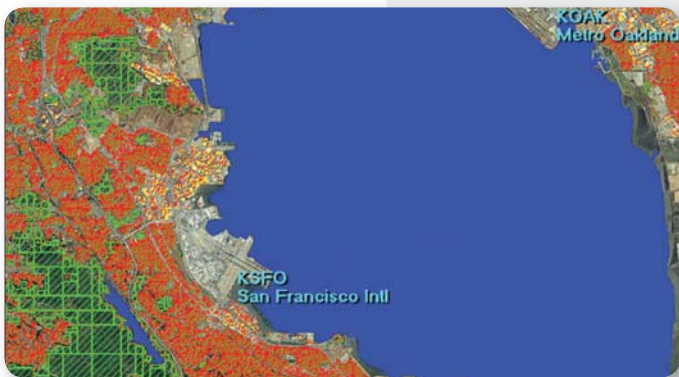
If the MegaScenery area has snow during winter, like our New York product, then we’ll create a winter scenery set. Generation of the winter scenery is automatic using our custom software and turns a summer scene into a winter scene. So, when you fly with winter textures, you’re actually flying over computer generated images. But, because the roads can be seen, and there’s variation in the snow coverage, the scenery looks reasonably realistic. Again, the images for winter must be sliced into the smaller DXT images for display in FS2004.

CP: In addition to new images, don’t you also improve upon the terrain?

AM: Digital Elevation Mesh, or DEM, is also incorporated into the scenery. In MegaScenery Northern California we use 30-meter mesh. Picture a large, square grid, like a piece of graph paper. Imagine that at each point where the lines intersect is a value that represents the height of the ground, or elevation. All of the heights vary, of course, and the differing height at each intersection stretches the mesh into the shape of the actual land. This is what gives the appearance of rolling hills or towering mountains. Every 30 meters, MSFS uses these elevation points to build the shape of the mountain. Then, the satellite images are draped over the mesh to complete the scene, like a table cloth over a table covered with objects.

CP: Do we see default or custom auto-gen objects in MegaScenery?

AM: As most users know, recent versions of MSFS use a technique called auto-gen for the pseudo-random placement of 3D objects such as trees, houses and medium sized buildings. Every single 256x256 tile in MegaScenery has a unique auto-gen tile associated with it where 3D auto-gen objects are placed on it. There are thousands of individual auto-gen files used in MegaScenery, and our proprietary software determines what objects should be placed on the satellite images and creates the auto-gen files for those objects. For example, it automatically places trees in the forest areas, and places pseudo-random houses in the residential areas.



AUTO-GEN OBJECTS PLACED FOR SAN FRANCISCO.

Because our auto-gen technique is pseudo random, we then alter hundreds of auto-gen areas by hand, around commonly flown areas such as airports and cities. This work is time consuming, but it enhances the look of the scenery for the pilot.



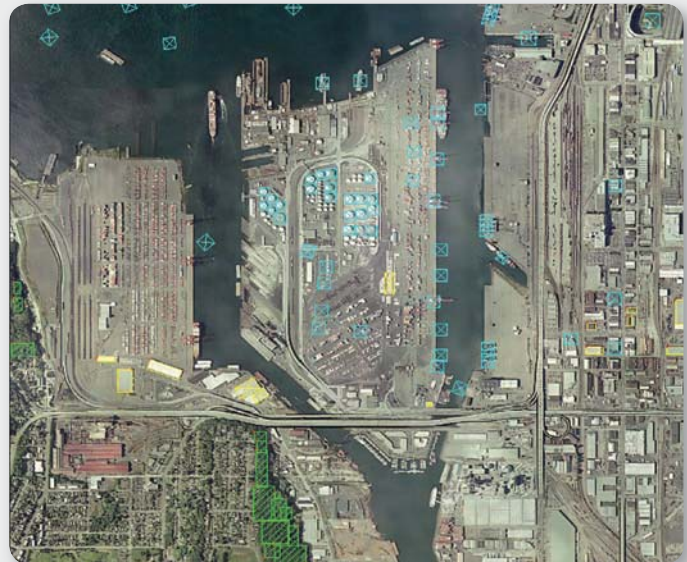
DETAILED VIEW OF THE AUTO-GEN OBJECTS THAT CAN BE MOVED AND POSITIONED BY HAND.

Our software can display enormous areas of scenery with thousands of colored polygons indicating the type of 3D object covering that area so we can move around the area with reasonable ease. The same software lists every world airport and we check each airport and runway for obstructions like trees and buildings. Our software has recently been updated to allow the alignment of runway, taxiway and apron data. Each point covering the airport can be moved and recompiled for use in FS2004 using the Microsoft Software Development Kit. (SDK)



UPDATING RUNWAYS, TAXIWAYS AND APRONS FOR CORRECT POSITIONING OVER THE SCENERY.

Finally, we move default 3D objects to their correct position on the scenery. These include ships, cranes, bridges, stadiums and major buildings for that area. The models can be positioned, scaled, rotated, copied or deleted.



PLACEMENT OF 3D MODELS THAT CAN BE POSITIONED, SCALED AND ROTATED.

CP: Is the scenery ready at this point?

AM: Almost! Finally we compile BGL files which contain all of the information required for MSFS to display the scenery. These files act as indexes that tell MSFS the coordinates of the scenery area covered and what to put there. BGL files also hold the digital elevation data. The scenery is now complete and packed into our custom installer. It's then burnt onto gold master CD-ROMs and is ready for duplication, production and packaging.

CP: What happens during installation?

AM: In the final product, the custom installation software copies thousands of files onto the user's hard disk. If the user's system is using NTFS, such as most Windows XP users, then the installation is compressed onto their hard disk using the native windows NTFS file compression. MegaScenery can take around three gigabytes of hard disk space and we employ compression to save around 1/3 of this. There is no noticeable impact on performance in MSFS when using the scenery from compressed files. Generally, the files load from the hard disk faster than a non-compressed file because of their smaller size, and because the files are relatively small, decompression is very quick. Surprisingly to most users, MegaScenery actually improves performance of MSFS by allowing higher frame rates. Because the scenery images are precompiled, MSFS simply loads them and displays them. With the default scenery, MSFS has to calculate the image from data and then display it. The calculation is the process that can have an impact on frame rates.

CP: Thanks, Andrew, for taking the time to chat with CP readers!

AM: It's been my pleasure, and I sincerely hope that readers will enjoy flights with MegaScenery Northern California. We're always developing the product and the next release, MegaScenery Pacific Northwest, will have even more features! →