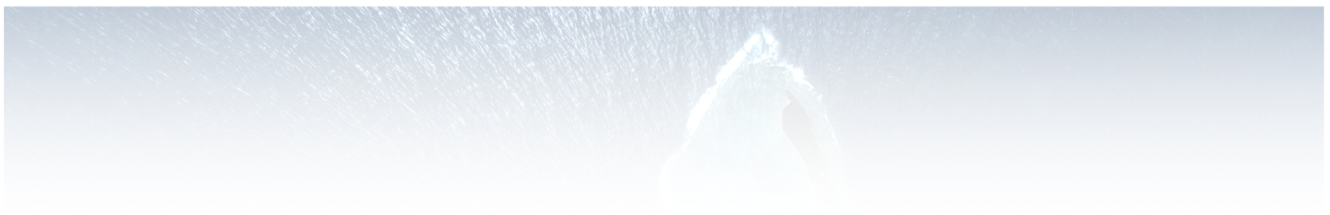

Ultimate VFR Guam 3.0

The Ultimate Photoscenery for Microsoft® Flight Simulator X

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Ultimate VFR Guam 3.0 Manual

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Many thanks go to the entire flight simulator community who have helped make this project the leading photoscenery project for Microsoft Flight Simulator X!

Extra special thanks goes to my wife who has supported me in this journey over the last seven years. Without your support through the many sleepless nights, \$1 meals and personal sacrifices this project would not have been possible. I am very thankful to have a loving and supportive wife such as you.

And of course special thanks to my family and friends who have encouraged me not to give up on this journey. When all has seemed impossible and the road ahead has seemed insurmountable, you have cheered me on and encouraged me not to give up as you saw that this project was something special.

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Ultimate VFR Guam 2.0

Manual

Enhanced Photoscenery Add-on for

Microsoft® Flight Simulator X

Contents

Introduction 6

About Us 7

 Mission Aware Technologies 7

 Digital Earth Data 7

 Dean Mountford 8

System Requirements 9

Installation 10

 Removing 11

Support 12

Updates 12

Features of Ultimate VFR Scenery 13

Elements of Ultimate VFR Scenery 14

 Ultimate VFR Imagery 14

 Ultimate VFR Water 14

 Ultimate VFR Autogen 15

 Ultimate VFR Night Lighting 15

 Ultimate VFR Audio Environment 15

 Ultimate VFR Airports 15

Recommended Settings 16

 Graphics 16

 Weather 18

 Scenery 20

 Traffic 22

File & Data structure 23

Airport Locations 24

Exploring & Sightseeing 25

Frequently Asked Questions 28

Appendix 37

 Known Issues 37

Introduction

Ultimate VFR 3.0 is designed to be the ultimate in high detail photoscenery for Microsoft® Flight Simulator X.

The Ultimate VFR series provides 1.2m per pixel, professionally color corrected, color graded, performance and full color spectrum optimized photoscenery for the United States based on 1m per pixel aerial imagery from the United States Department of Agriculture's (USDA) National Aerial Imaging Program (NAIP).

The Ultimate VFR photoscenery series started development in 2006 during the Microsoft Flight Simulator X beta testing period.

Initially we envisioned providing 1 meter per pixel photoscenery coverage for the entire continental United States. Our photoscenery was planned to complement an already established photoscenery product line that only covered limited areas.

However as we shared our dreams, research and development and goals with the flight simulation community we soon realized that our photoscenery needed to contain much more than just basic aerial imagery. We started the long process of developing technology that can generate USA wide photoscenery very rapidly and on a massive scale.

We set to work on developing tools, technologies and techniques to provide the level of detail that we ourselves longed for, but also our friends in the flight simulation community were asking for.

Over the years we hit a few roadblocks that stalled development. Family medical issues involving triple bypass open heart surgery and kidney transplants meant our priorities were diverted elsewhere. Even though development of our Ultimate VFR series slowed we continued to work behind the scenes to see our vision become a reality.

Many of you have supported us along the way and without your help and investment into our vision this project would not have become a reality in 2014.

About Us

Mission Aware Technologies

Mission Aware Technologies was launched in 2014 and is a company focused on developing high resolution terrain models and databases for use in flight simulation, film and television production, embedded graphics markets and various other industries.

Mission Aware Technologies is a company that is Mission Aware in two regards:

First in being aware of our clients needs be it Aerospace, Defense, Film & Television Production, Urban Planning, Telecommunications, Oil & Gas Exploration, Mining, Transport, Communications, Visual Simulation or Embedded Graphics Markets.

Second is in being a support to agencies and NGO's that go into all the world seeking to fulfill the Great Commission.

Our geospatially aware technology, terrain models and databases help all our clients to make the most informed decisions in their various missions and roles.

Digital Earth Data

Digital Earth Data is a new generation geospatial data and services company headquartered on the Gold Coast in Queensland, Australia. Founded in 2014 Digital Earth Data provides aerial imagery, image processing, terrain databases, elevation data, vector mapping data and custom mapping services to commercial and government customers worldwide.

Digital Earth Data's online geospatial data store has been developed as a unique one stop e-commerce enabled data distribution channel for refined, high quality, integrated, intelligent, geospatial datasets derived from public domain and open source datasets.

Custom services include image optimization, color correction, color grading, terrain database generation, data integration & conversion and 3D city, state & country modeling.

Dean Mountford

Dean is a licensed pilot and grew up around aviation since birth. He is the son of a Boeing 727-277 and 767-277 Flight Engineer and from an early age was exposed to Level-D Boeing simulators at Ansett Airlines.

Dean is also a professional film maker with over 20 years experience in Film and Television production on major motion pictures and television shows such as Flipper, Beastmaster, The Lost World and several other movies. In his professional film career Dean has developed advanced skills in image color correction and enhancement which allows him to develop advanced terrain database models which are superior in image quality, color and accuracy than what is currently available.

A user of Flight Simulator since Sublogic's version 1 over 30 years ago, Dean has an intimate knowledge of the simulation platform that very few people have. Dean was also on the beta team for Microsoft Flight Simulator X and was part of the Design Advisory Board for the Microsoft Flight Simulator 11 which Microsoft unfortunately cancelled when they shut down the ACES team.

For the last 8 years Dean has been developing his skills with Geospatial Software that allows him to convert raw aerial imagery from the U.S. National Agriculture Imaging Program (NAIP) and convert it for use as a finished product to enhance Lockheed Martin Prepar3d, Microsoft Flight Simulator X and Microsoft ESP. He has also developed software scripts and programs to develop these databases with the click of a button through automation.

As a private pilot, Dean places a high value on flight simulator terrain databases being as real as it gets. Flying in a simulator that emulates the earth's terrain as close as possible to the real world means that licensed pilots are able to practice real world maneuvers and navigation exercises with an accurate frame of reference within the simulator. Such accuracy allows pilots to become better trained, can save lives and help with air crash investigations.

For home enthusiasts flying over accurate landscapes in a flight simulator allows for virtual travel experiences to exotic places they potentially would never see in real life. It is also an excellent tool to assist those interested in an aviation career as flight crew.

System Requirements

Minimum System Requirements

- Microsoft® Flight Simulator X (available at <http://www.fsinsider.com>)
- Graphics card: 256 MB of memory minimum
- CPU: 3 GHz duo core (2.6-2.8 GHz quad core)
- 1 GB RAM
- 1 GB free disk space
- Sound Card
- Windows XP, Windows Vista, Windows 7, Windows 8 or 8.1 (fully updated)
- Adobe Acrobat® Reader (most recent) to read and print the manual
(available at <http://www.adobe.com/products/reader.html>)

Recommended Ultra Performance System Requirements

- Microsoft® Flight Simulator X (available at <http://www.fsinsider.com>)
- Graphics card: 1 GB of memory minimum
- CPU: 4+ GHz Intel quad core
- Chipset: Intel
- 8 GB RAM minimum (32 recommended)
- 4 TB free disk space (RAIDED)
- 7.1 Surround Sound Card
- Windows 7 (recommended) Windows 8 or 8.1 (for power users)
- Adobe Acrobat® Reader (most recent) to read and print the manual
(available at <http://www.adobe.com/products/reader.html>)

Installation

In the links provided in your purchase, download and save the installer on your hard drive.

1. Run the installer (e.g. uvfr_gu_gum.exe) and select "Next >"
2. Read through the Information page and select "Next >"
3. Read carefully through the License page
4. Select "I agree with the above terms and conditions" and select "Next >"
5. Select the Directory you wish to install the scenery into and select "Next >"
6. Select "Start" to install
7. Installation may take a few minutes or appear stalled, this is due to the large size
8. Click "View Ultimate_VFR.pdf" to read the manual
9. Click "Exit" to exit the installer
10. The License Agreement will automatically open when exiting the installer

Note:

The Ultimate VFR Guam photoscenery will be installed into the main:

..\Flight Simulator X\Ultimate VFR\Ultimate VFR Guam folder.

The Ultimate VFR Guam Night Lighting will be installed into the main:

..\Flight Simulator X\Ultimate VFR\Ultimate VFR Guam Lighting folder.

The Ultimate VFR Guam Optional Sound Effects will be installed into the main:

..\Flight Simulator X\Ultimate VFR\Ultimate VFR Guam\OptionalSoundEffects
folder.

The Documentation and the End User License Agreement can be found in the main:

..\Flight Simulator X\Ultimate VFR\Documents folder.

Removing

Step 1

To uninstall run the uninstaller (e.g. *Uninstall UVFR Guam*) from the Steam DLC Menu under the *Flight Simulator X: Steam Edition* menu option.

Support

Support for this product is provided by Mission Aware Technologies. We prefer to utilize an Ultimate VFR Support Group page on Facebook as it provides a more secure and personal support page where customers can help other customers while our offices are closed outside business hours. The Ultimate VFR Support Group page can be found at:

<http://www.ultimatevfr.com>

We are serious about supporting our products. We're as passionate as you are about photoscenery and flight simulation. Purchasing one of our products gives you access to our time and energy with questions regarding our products. There is no such thing as a silly question and we will work hard to ensure you are as happy with our products as we are.

Features of Ultimate VFR Scenery

Ultimate VFR Guam 2.0 is not your standard photoscenery. Our photoscenery includes a complete overhaul of the Island of Guam which is located in Micronesia in the western Pacific Ocean. Guam is located approximately 1,500 miles (2,500 km) south of Japan, 1,500 miles (2,500 km) east of the Philippines and 4,000 miles (6,400 km) west of Hawaii.

Features

- 1.2m per pixel Aerial Imagery
- 2.75m Terrain Elevation Data
- Airport & Facilities Data (AFCAD/AFX) for PGUM and PGUA
- Airport Flattens
- Autogen Vegetation
- Custom Scenery Objects
 - ❖ Chamorro Village
 - ❖ Fiesta Hotel
 - ❖ Dulce Nombre de Maria Cathedral Basilica
 - ❖ Bank of Guam
 - ❖ Carmen's Cha Cha Cha Mexican Restaurant
 - ❖ Gazebo Plaza De Espana Hagåtña
 - ❖ International Trade Center
 - ❖ Paseo Stadium
 - ❖ Saint John's School & Church
 - ❖ University of Guam
- Custom Waterclass Map
- Excludes for Default Scenery
- Population Density Map - Introduces AI Leisure Boats offshore
- Freeway Vehicle Traffic - Moving vehicles on all roads
- Street Light FX - High Pressure Sodium, Sodium Vapor, Metal Halide & Mercury Vapor
- Street Light Ground Lighting FX
- Water Mapping - Hand traced highly accurate Lakes, Rivers, Water Bodies and Coastlines
- Sound FX System - Optional - Island Wide (Nature and human activity sound system)

Elements of Ultimate VFR Scenery

Mission Aware Technologies has designed Ultimate VFR Guam 2.0 to be a complete scenery package, with numerous scenery elements dependent upon source data availability.

Ultimate VFR Imagery

Ultimate VFR Imagery is our image optimized and color corrected base aerial imagery layer for all of our photoscenery products including coverage for the mainland United States.

Our unique *SpectrumColor* technology gives us the ability to generate high definition photoscenery with the full natural color spectrum retained. What this means is no loss of resolution or color in our photoscenery products. We work with high end film grade production equipment utilizing advanced image correction algorithms to provide you, the customer with the best visual experience for photoscenery possible.

Our specialized *CrystalStream* image compression technology and techniques mean Ultimate VFR photosceneries function at peak performance whilst reducing CPU, GPU and Hard Drive load which results in crisp, clear and streamlined imagery at runtime within Flight Simulator X.

Ultimate VFR Water

Ultimate VFR Water is our configurable water layer for all of our photoscenery products covering the mainland United States. This water layer will initially come in one version with a uniform deep blue water color which, in testing, we found provides the best user experience in Microsoft Flight Simulator X. For Ultimate VFR Guam 2.0 we use the natural water color.

This water layer uses our unique *HydroTek* technology and allows us to provide future upgrades which will further enhance the water system. These planned upgrades will provide users with a choice of different water configurations based upon their own preferences.

We'll provide more information on this technology as our *HydroTek* system develops.

Ultimate VFR Autogen Preview

Ultimate VFR Autogen is our latest technology that is currently under development. At this point we are hard at work developing autogen vegetation systems for each state on a massive scale. We will be releasing Autogen Vegetation as a free upgrade to all Ultimate VFR products once we are code complete with the technology. Ultimate VFR Guam 2.0 comes with high definition autogen vegetation dataset preview.

Ultimate VFR Night Lighting Preview

Ultimate VFR Night Lighting is another technology currently under development at Mission Aware Technologies. Our *NightGlow* lighting technology will include dense city lights that are accurate to real life color temperatures of various street light types such as High Pressure Sodium, Sodium Vapor, Mercury Vapor and Metal Halide etc. Our night lighting system utilizes real world specifications and will give the most accurate representation of cities at night. Ultimate VFR Guam 2.0 comes with our night lighting system preview.

Ultimate VFR Audio Environment

Ultimate VFR Audio Environment provides island wide customized environment sounds, from nature sounds, human activities, marina and ocean ambiance and much more.

Our advanced *GeoTone* audio environment technology truly brings Microsoft Flight Simulator X to life. You'll feel as if you're really there hearing the world around you as you would in real life. No more silent environments.

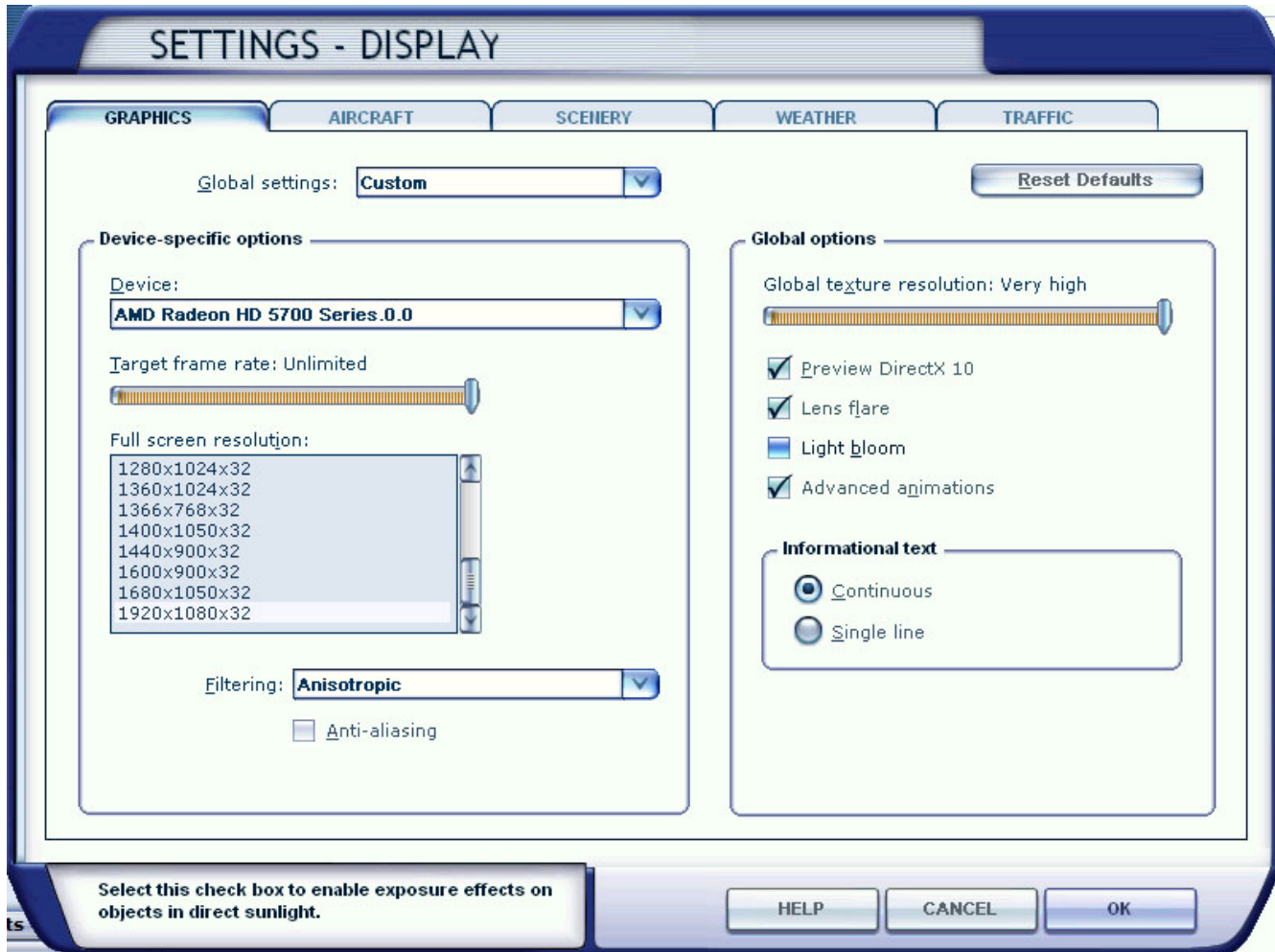
Ultimate VFR Airports

Ultimate VFR Airports are a community supported AFX/AFCAD repository that we will be hosting. As many FSX default airports are not accurate to their real world locations, users will be able to upload their favorite airport's to match the photoscenery and we'll host the files for you to download free. Airports will be compatible with Ultimate Traffic. Ultimate VFR Guam 2.0 comes with hand built AFX/AFCAD airports for PGUM and PGUA.

Recommended Settings

In order to obtain the best performance from Ultimate VFR photosceneries we recommend certain settings in order to maximize both performance and user experience.

GRAPHICS



Preview Direct X 10: On. DirectX 10 increases frame rates and performance on Windows Vista, 7 and 8, however some video drivers have issues with aliasing (i.e. jaggies) in FSX when it is turned on. This setting improves frame rates substantially.

Global texture resolution: Very high. Global texture resolution affects mipmapping. This setting has very little effect on frame rates but does use up more video card memory.

Lens Flare: On or Off. Lens flare is the effect which looks like light passing through the lens of a DSLR camera and can be set depending on what you prefer. This setting has very little effect on frame rates and has minimal impact on video card memory.

Light Bloom: Off. Light Bloom is a Shader 2.0 effect and affects frame rates and performance. We recommend having this turned off unless you are using DirectX 10 mode.

Advanced Animations: On. Advanced animations include animated wildlife and wing flex animations in sim. We recommend this setting being on. This setting has very little effect on frame rates.

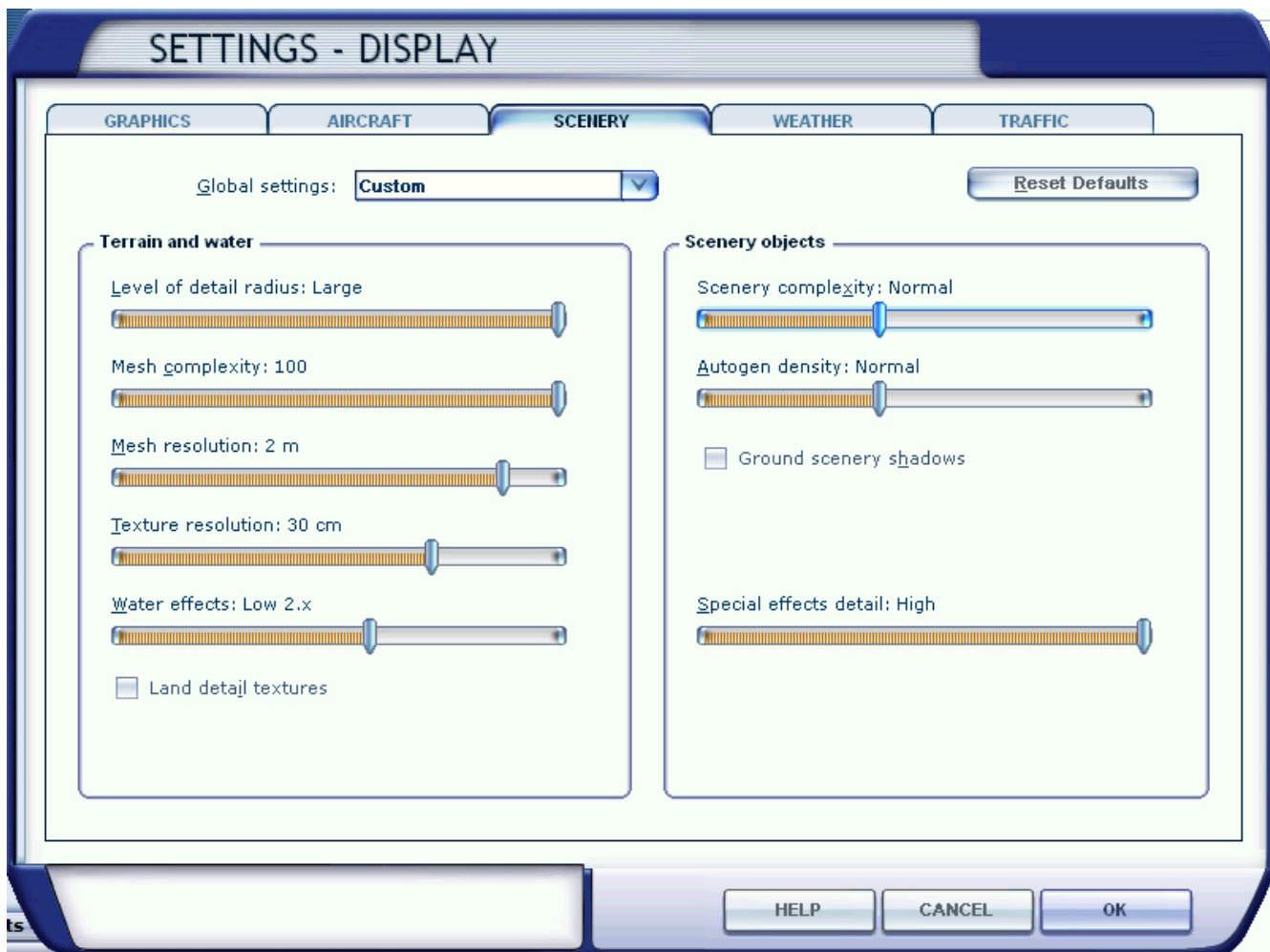
Target frame rate: 24, 25, 30, 48, 50, 60 or Unlimited. We recommend several options for target frame rates depending on your preference. 24 fps for a Cinematic Film feel. 25 fps if you like PAL TV frame rates, 30 fps for NTSC TV frame rates, 48 fps to emulate double shuttered Cinematic Film, 50 fps to emulate 50p HDTV or 60 fps to emulate 60p HDTV.

Alternatively you can set this to Unlimited if you have a super powerful videocard and CPU. Remember the frame rate limiter means that the slower the frame rate the more processing power will be available to the CPU to draw 3D scenery objects and autogen.

Filtering: Antistropic. Antistropic filtering is the best choice for photoscenery. It eliminates mipmap blurries that are very obvious under both bilinear and trilinear settings. This setting also improves frame rates. This setting should be used in conjunction with your video card driver settings from NVIDIA or AMD/ATI.

Anti-aliasing: Off. FSX anti-aliasing is not very effective and it is best to use anti-aliasing settings on your video card. Turning off FSX anti-aliasing improves frame rates. Anti-aliasing settings should be turned on with your video card driver settings from NVIDIA or AMD/ATI.

SCENERY



Level of detail radius: Large. This setting is important for photoscenery. Having the level of detail radius set to large means that the scenery will display at high resolution away from the aircraft. This setting has very little effect on frame rates and has minimal impact on video card memory.

Mesh complexity: 100. With modern computers mesh complexity can be set to 100. This setting only affects the elevation data (i.e. the shape of the mountains) and should be set to maximum to retain the highest level of detail in the in the elevation datasets. This setting has very little effect on frame rates and has minimal impact on video card memory.

Mesh resolution: 2m. This can be set to a users preference, however some of our Ultimate VFR sceneries include elevation data that has elevation samples 2m apart. This should be set to the highest quality elevation data scenery you have installed. This setting has very little effect on frame rates and has minimal impact on video card memory.

Texture resolution: 30m. This can be set to a users preference, however most of our Ultimate VFR sceneries include imagery data that is 1m per pixel and even as high as 30cm per pixel. This should be set to the highest resolution photoscenery you have installed. This setting has very little effect on frame rates and has minimal impact on video card memory.

Water effects: Low 2.x. Our water modeling is designed specifically to be used with FSX's shader 2.0 system which renders water much more realistically. We recommend Low 2.x as the starting point for your scenery settings as higher settings can affect frame rates significantly. This setting has a significant effect on frame rates and has some impact on video card memory.

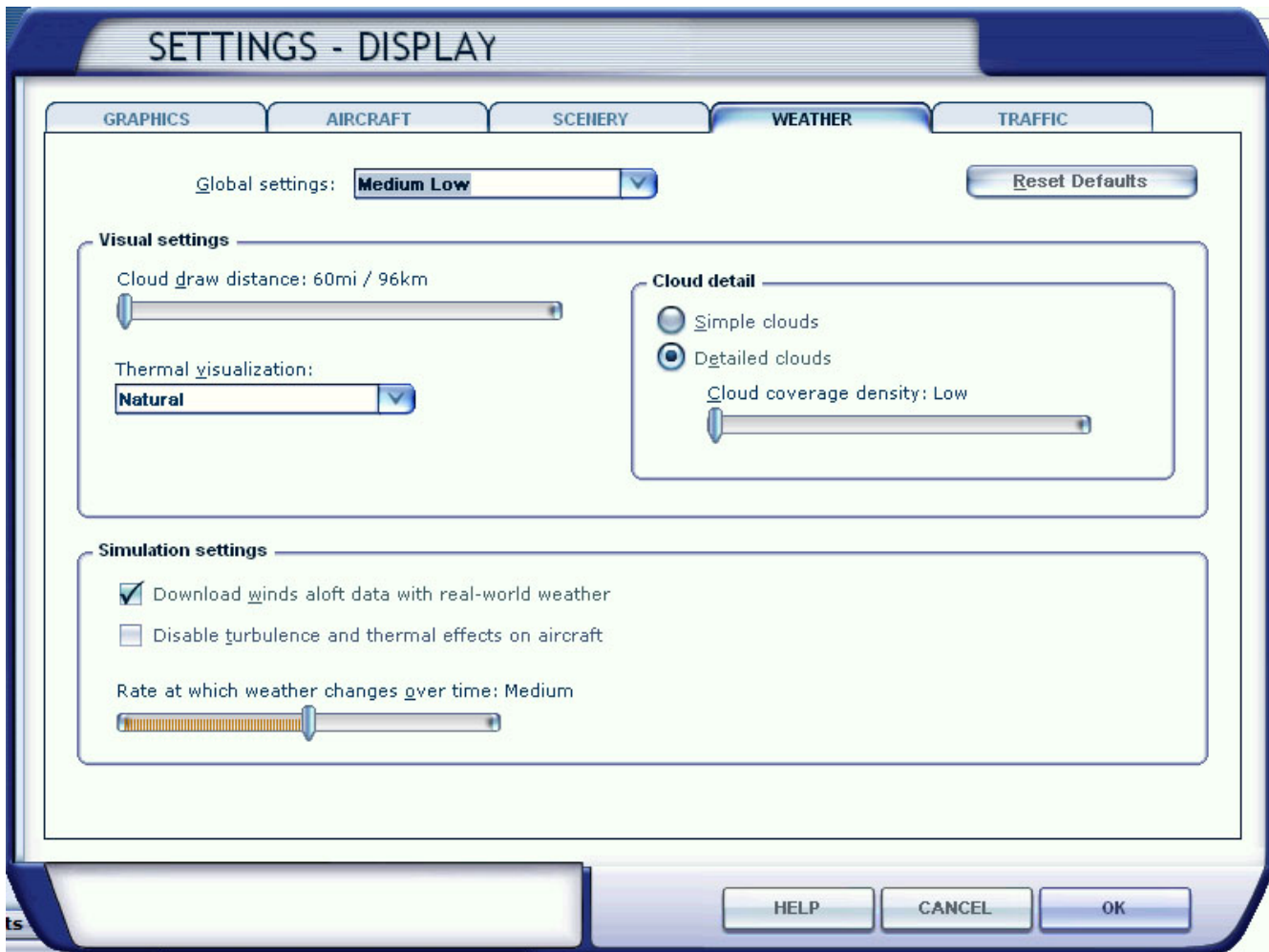
Land detail textures: Off. Land detail textures aren't really relevant for photoscenery and we recommend this setting being turned off. This setting has very little effect on frame rates and has minimal impact on video card memory.

Scenery complexity: Normal. We recommend *Scenery complexity* be set to a minimum of *Normal*. This is due to the fact most airports have jetways/aerobridges that look strange if the *Scenery complexity* is set any lower. If you have a powerful CPU and video card then feel free to turn this setting up to *Extremely dense*. This setting has significant little effect on frame rates (depending on what other scenery add-ons you have installed) and has an impact on video card memory.

Autogen density: Normal. We recommend *Autogen denisty* be set to a minimum of *Normal*. Autogen has a substantial impact on CPU load in FSX and if you find frame rates are low try turning autogen down to *Low* or *Off*. If you have a powerful CPU and video card then feel free to turn this setting up to *Extremely dense*.

Special effects: High. Special effects can be set to high and this is what we recommend for the best display of all FSX effects. This setting has very little effect on frame rates and has minimal impact on video card memory.

WEATHER



Cloud draw distance: 60mi / 96km. This setting defines how far away from the aircraft clouds will be drawn on screen. We recommend the lowest setting for high performance. This setting has a reasonable effect on frame rates especially when flying in overcast or stormy weather.

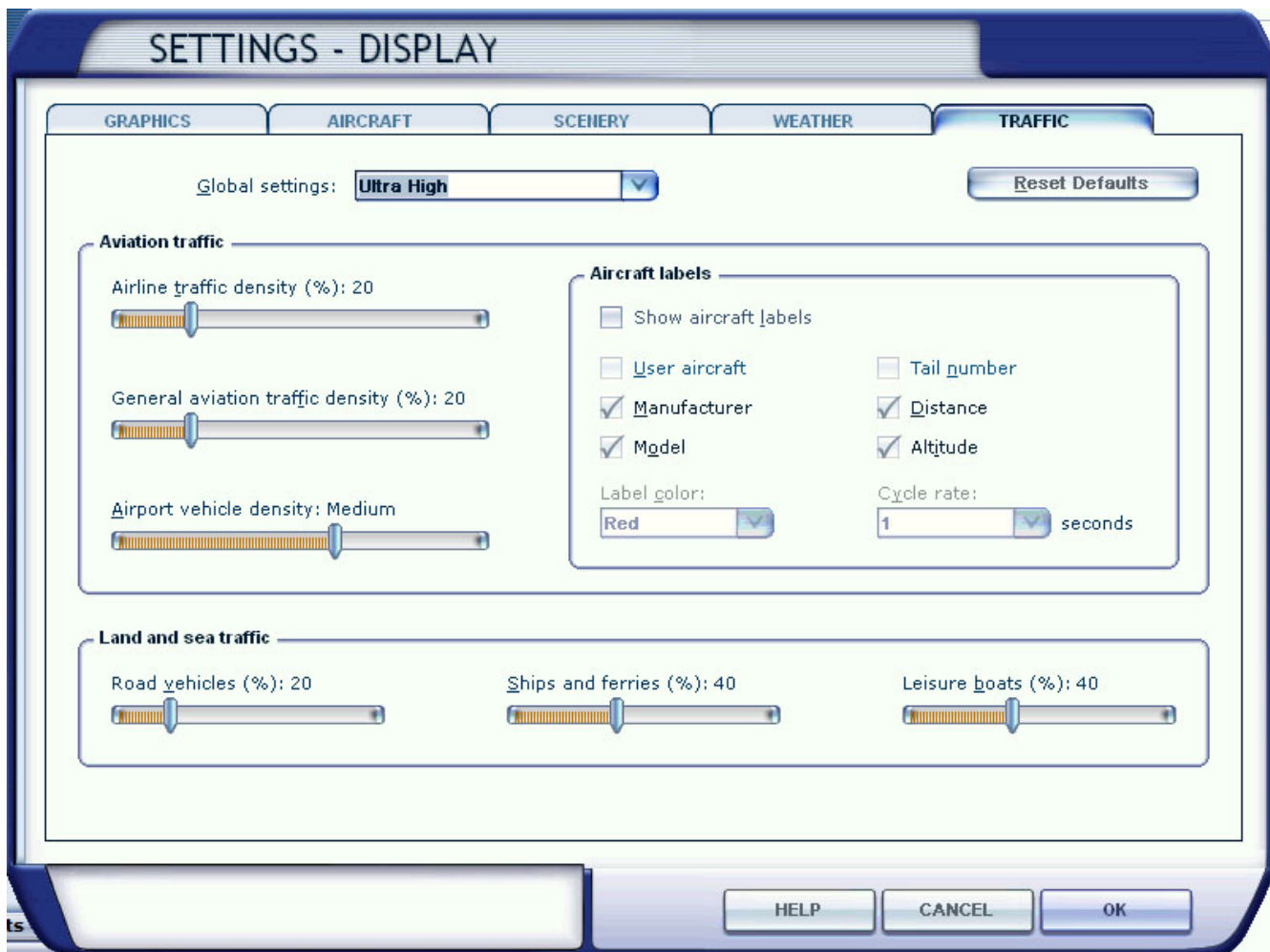
Theme visualization: Natural. As in real life thermals are not normally visible to the naked eye, although FSX can help with a 3D representation of thermals we highly recommend the Natural setting as this will provide the most realistic experience visually. Natural visualization means that you will see eagles present where there are thermals. This setting has very little effect on frame rates and has minimal impact on video card memory.

Cloud detail: Detailed clouds. This defines whether the clouds are simple or complex in the simulator. We highly recommend detailed clouds for the best representation in FSX.

This setting can affect frame rates depending on Cloud coverage density setting listed below.

Cloud coverage density: Low. This setting defines how dense the cloud coverage will be in the simulator. We recommend the lowest setting for high performance. This setting has a significant effect on frame rates especially when flying in overcast or stormy weather and can increase the memory usage on the video card.

TRAFFIC



Global settings: Ultra High. We have found that *Global settings* set to *Ultra High* give the most realistic experience in Microsoft® Flight Simulator when it comes to traffic. If using Ultimate Traffic from Flight 1 we do recommend turning Aviation traffic settings all the way up high for best effect. Traffic can have an impact on frame rates though, particularly around busy airports. We find that *Road vehicles* look the most realistic in FSX set to 20% during non-peak hour traffic. *Ships and ferries* and *Leisure boats* can be turned up to 100% as well and will not have a major impact upon frame rates. For the most realistic flight experience we also turn off *Show aircraft labels* as visual tags for aircraft won't likely be seen in real life until augmented reality technology catches up.

File & Data Structure

Advanced users may want to take a closer look at the files and folder structure for Ultimate VFR in order to debug compatibility issues or make modifications to suit their individual requirements. Our file and folder structure can be found below:

- **Ultimate VFR**
 - **Documents**
 - ❖ EULA_UltimateVFR.pdf (*End User License Agreement*)
 - ❖ UltimateVFR_2.0_Manual.pdf (*Ultimate VFR Manual*)
 - **Ultimate VFR Imagery [State Name]**
 - **Alternate Street Lights**
 - ❖ uvfr_streetlight_*.bgl (*Optional Street Lights at Various Heights*)
 - **Scenery**
 - ❖ uvfr_afd_*.bgl (*AFX/AFCAD files*)
 - ❖ uvfr_airportflatten_*.bgl (*Airport Flatten files*)
 - ❖ uvfr_custom_*.bgl (*Custom Scenery Object files*)
 - ❖ uvfr_elevation_*.bgl (*Elevation Data files*)
 - ❖ uvfr_exclude_*.bgl (*Exclude files*)
 - ❖ uvfr_freeway_*.bgl (*Road Vehicle Traffic files*)
 - ❖ uvfr_hydro_*.bgl (*Ocean & River Water Bodies files*)
 - ❖ uvfr_lakes_*.bgl (*Lake Water Bodies files*)
 - ❖ uvfr_library_*.bgl (*Scenery Library files*)
 - ❖ uvfr_night_*.bgl (*Night Lights files*)
 - ❖ uvfr_objects_*.bgl (*Scenery Objects files*)
 - ❖ uvfr_population_*.bgl (*Population Density files*)
 - ❖ uvfr_shoreline_*.bgl (*Shoreline and Wave Effect files*)
 - ❖ uvfr_sfx_*.bgl (*Sound Effects files*)
 - ❖ uvfr_streetlight_*.bgl (*Street Light files*)
 - ❖ uvfr_v_*.bgl (*Aerial Image files*)
 - ❖ uvfr_waterclass_*.bgl (*Water Class files*)
 - **Texture**
 - *.agn (*Autogen Object Placement data*)
 - *.dds (*Scenery Object Texture files*)
 - **Ultimate VFR Water [State Name]**
 - **Scenery**
 - uvfr_w_*.bgl (*AFX/AFCAD files*)

Airport Locations

PGUM - Antonio B. Won Pat International Airport

Antonio B. Won Pat International Airport (IATA: GUM, ICAO: PGUM), also known as Guam International Airport, is an airport located in Tamuning and Barrigada, three miles east of the capital city of Hagåtña (formerly Agana) in the United States territory of Guam. It is named after Antonio Borja Won Pat, the first delegate from Guam to the United States House of Representatives, and is operated by the A.B. Won Pat International Airport Authority, Guam (GIAA, Chamorro: Aturidat Puetton Batkon Airen Guahan Entenasionat), an agency of the Government of Guam.

The airport is a hub for United Airlines and Asia Pacific Airlines and is also the home of the former Naval Air Station Agana.

PGUA - Andersen Air Force Base

Andersen Air Force Base (AFB) (IATA: UAM, ICAO: PGUA, FAA LID: UAM) is a United States Air Force (USAF) base located approximately 4 miles (6.4 km) northeast of Yigo near Agafo Gumas in the United States territory of Guam. Along with Naval Base Guam, Andersen AFB was placed under the command of Joint Region Marianas on October 1, 2009. The two bases are about 30 miles away at opposite ends of the island. Administration offices for Joint Region Marianas are about half-way in between, at Nimitz Hill.

The host unit at Andersen AFB is the 36th Wing (36 WG), assigned to the Pacific Air Forces Thirteenth Air Force. A non-flying wing, the 36 WG's mission is to provide support to deployed air and space forces of USAF and foreign air forces to Andersen, and to support tenant units assigned to the base.

Andersen AFB was established in 1944 as North Field and is named for Brigadier General James Roy Andersen (1904–1945). The 36th Wing commander is Brig. Gen. John Doucette. The Command Chief Master Sergeant is Chief Master Sergeant James Slisik.

Source: Wikipedia

Exploring & Sightseeing

Hafa Adai! Welcome to the beautiful pacific island of Guam, "Where America's Day Begins!" Ultimate VFR Guam 2.0 has so much for the VFR pilot to explore.

Your journey will likely start at PGUM - Antonio B. Won Pat International Airport. With your aircraft cold and dark you will hear the sounds of the airport environment, jet engines running and vehicles in the airport parking lot. If you taxi over to the maintenance hangars you will find emergency training taking place at the Airport Rescue & Fire Fighting Unit (ARFF) as well as aircraft maintenance taking place in one of the open GA hangars.

Heading out west over Tumon Bay you will see representations of the hotels along the beach. From the lifeguard tower at Matapang Beach to kayakers in the water, you will find all manner of activities taking place. You'll hear the sounds of the ocean shore along the waterfront and the sounds of tropical birds in the trees.

Turning south you'll fly over the waters in front of the Santa Fe Hotel at Agana Bay. You'll hear the sounds of jet skis and wave runners in the bay, as well as the gentle tropical island sounds of Guam as you would in real life.

Continuing west you'll fly over Chamorro Village and Paseo Stadium and the Hagåtña Boat Basin. Listen quietly as you hear the sounds of the boats in the marina and the channel buoys at the entrance to the marina. On weekends you will hear baseball games taking place at Paseo Stadium. During the year on special days you will also witness fireworks displays over Hagåtña Bay.

Looking to your left you will find Dulce Nombre de Maria Cathedral, Gazebo Plaza De Espana, the Bank of Guam building, Carmen's Cha Cha Cha Mexican Restaurant and representations of the Hagåtña Post Office, Agana Shopping Center and the DNA Building.

Continuing west we run into War in the Pacific National Park at Asan Beach. One of the locations in World War II where the United States landed in 1944 and took back control

after the Japanese invasion of 1941. This park is characterized by coconut trees along the waterfront and a memorial to all who fought for Guam's freedom in the Pacific during WWII.

Further west we find the Fish Eye Marine Park and Underwater Observatory at Piti Bay. The bay is one of the island's few naturally protected lagoons that preserves and promotes Guam's beautiful natural corals. The fringing reef keeps the water inside Piti Bay very calm from the oceanic waters of the Philippine Sea outside. The bay is famous for the Piti Bomb Holes, which were not in fact caused by bombs but were formed by sinkholes created by collapsed caves. It is one of the island's best scuba diving locations.

Heading further west we run into Apra Harbor and Navy Base. Here you will find the Cruise and Cargo Ship terminals with a cruise ship in port and a throng of passengers alongside. If you're there around sunset you may also hear the cruise ship blowing its horn signaling that it is about to leave port. You'll also find the Piti Power Plant run by the Guam Power Authority (GPA) which provides most of the electricity to the island. Located here are also the U.S. Navy Base, an Aircraft Carrier at anchor, the U.S. Coast Guard dock, several ships in the harbor and a couple of marinas. You'll also see the dormant runways from the former Orote Field airbase which was closed in 1946. The runways still see some use as a touch-and-go training strip used by C-130 Hercules crews located nearby at Andersen Air Force Base (PGUA).

Traveling south you'll encounter Merizo Pier Park and Cocos Island. Cocos Island is an island 1 mile (1.6 km) off the southern tip of Guam, located within the Merizo Barrier Reef. The island sits atop the southwestern coral reef rim of Cocos Lagoon. The west coast of the island is a day resort with a pool, volleyball court, cafe, ice cream parlor, restaurant and bar, and water sports equipment rentals. Visitors to the resort can snorkel, dive, kayak, dolphin watch, parasail, jet ski and bike. The east side is public land part of the Territorial Park System. At the southern end of Guam you'll find San Dimas Catholic Church at Merizo.

Continuing around the island you will fly over Achang Bay, the Inarajan Pools, Talafofo Bay, Pago Bay, the Country Club of the Pacific, the University of Guam, Mangilao Golf Club and Nimitz Golf Course. Along the way you'll also see Leoplace Resort, Pagat Point and Mt Santa Rosa.

Flying around the Northern tip of Guam you'll encounter Anderson Air Force Base, Northwest Field (a former World War II airfield which was closed in 1949), Ritidian Beach, Starts Guam Gold Resort, Ague Cove, Tanguisson Satellite Dish, Tanguisson Beach and Power plant. Further south you will encounter spectacular Two Lovers Point overlooking Guam's gorgeous sun drenched hotels and beach at beautiful Tumon Bay.

We hope you thoroughly enjoy your exploration of all that Ultimate VFR Guam has to offer. Don't forget to take a helicopter or sea plane around the island as well and be sure to shut down the engines and take in both the sights and sounds of Guam.

We are constantly seeking to improve our scenery products, so if you have any local knowledge, suggestions or would like become a strategic business partner with us developing 3D models and/or complimentary 3rd party products please contact us via Facebook at <https://www.facebook.com/groups/ultimatevfr> and send us a private message. You can also contact us via phone, email and twitter.

Frequently Asked Questions (FAQ)

The Ultimate VFR series is a photoscenery product utilizing real world aerial imagery sourced from the United States government. As such there are certain limitations for such a large scale product. We aim to provide a base photoscenery canvas that is true to life, that other freeware and commercial developers can build upon and enhance the scenery even further. Below are responses to some of the frequently asked questions we receive.

Q: Why don't some airports line properly up with the photoscenery?

A: As we primarily develop the photoscenery layer the airports as seen in FSX are still all default. The airports in FSX were designed based off high quality airport diagrams from Jeppesen. Most the source maps that were used for FSX are quite accurate, however not all of the data is 100% accurate to their real world locations. We provide the photoscenery canvas for other developers to use as a backdrop to develop these airports further through either freeware or commercial add-ons. We are in the process of setting up a freeware file library where we can host user updated AFX/AFCAD airport files for anyone in the Flight Simulator community to download.

Q: Why are there color variations and anomalies in the photoscenery?

A: As each state's aerial imagery is acquired over several days and the data gathering aircraft are flown at various times of day; the color temperature of the Sun changes from 3200°K (Degrees Kelvin) at Sunrise to 5600°K at Noon and shifting back towards 3200°K at Sunset. This leads to slight color variations from one captured image to another. This collected aerial imagery data is then collated via super computers at the United States Aerial Photography Field Office (U.S. APFO) and blended together to create a seamless blended final image. As these source images are several terabytes in size it is virtually impossible to correct these color variations without a powerful super computer.

Q: Why are the tall buildings in the photoscenery aerial imagery leaning?

A: Current aerial and satellite imaging technology have limitations. Not every building can be captured directly overhead at a 90 degree angle to the roof of a building. Even if you are able to get directly overhead of a building in the center of a city, each building in concentric rings surrounding that building will start to show signs of building lean in the photo. At this point in time in history even the world's super powers are limited by current photographic and aerial imaging technology.

Q: Why are there shadows from mountains and tall buildings visible?

A: As aerial and satellite imagery is done during various times of day, shadows from tall buildings and the back sides of mountains will be visible. The only way to avoid this is to take aerial imagery when the sun is directly overhead of an area that is being photographed. This is virtually impossible to achieve even for the world's leading aerial and satellite imaging countries. We do attempt to locate the best possible imagery data available for our Ultimate VFR photoscenery products. As global earth sciences and mapping technologies and aerial imagery capture advances our future product upgrades will also capture these enhancements.

Q: How can I change the height of the street light effects?

A: In the *Microsoft Flight Simulator X\Ultimate VFR\Ultimate VFR Guam\Alternate Street Lights* folder you will find *uvfr_streetlight_gu_guam_*.bgl* files. Each file has a specific height for each particular street light such as 10m, 15m or 20m as well as the type of light such as HPS (High Pressure Sodium), MH (Metal Halide), MV (Mercury Vapor) and SV (Sodium Vapor). Just swap out the *uvfr_streetlight_gu_guam_*20m.bgl* files in your Ultimate VFR/Ultimate VFR Guam/Scenery folder and move the old street light configuration file back to the *Ultimate VFR\Ultimate VFR Guam\Alternate Street Lights* folder for safekeeping in case you change your mind.

Q: What are the different street light variations and what do they mean?

A: Each street light file has a different light effect at night based on the type of light design such as HPS (High Pressure Sodium), MH (Metal Halide), MV (Mercury Vapor) and SV (Sodium Vapor). Each of these types of lights have a different color temperature based on real world scientific data. For example, Metal Halide and Mercury Vapor are both more white to light blue in color, whereas High Pressure Sodium and Sodium Vapor are both more yellow to orange in color.

Q: I'm not seeing the Ultimate VFR Water effects in FSX?

A: In your scenery library, ensure that the *Ultimate VFR Water [State]* layer is at a higher priority level than your *Ultimate VFR Imagery [State]* layer. In other words the water layer should be above the imagery layer in your scenery library.

Q: Can I turn off the Ultimate VFR Water effects and just use the aerial imagery to represent water?

A: Absolutely. We have designed the water layer effect layer to be turned off. This means that we've allowed users the option to either utilize our water system or if users prefer they can just use the aerial imagery, without FSX water effects, to represent the inland water bodies. Turning off the Ultimate VFR Water layer means that rivers will look

accurate to real life in full spectrum color, however the water will have the characteristics of land and you will not be able to land a float plane on the rivers and lakes.

Q: Why is the Ultimate VFR Water layer separate?

A: We have spent several years developing a destructible water system that allows us to quickly and easily upgrade the waterways in our sceneries without users needing to download the entire scenery datasets again. This allows us to refine our water datasets further and will also provide an enhanced user experience with our future *HydroTek* technology upgrade which is currently under development.

Q: Can I use Ultimate Terrain X with Ultimate VFR?

A: Yes. We designed Ultimate VFR to be compatible with Ultimate Terrain X. Elements of Ultimate Terrain X that can be seen with Ultimate VFR are the street lighting system and road/freeway moving traffic. Ultimate VFR is a photoscenery product which overlays Ultimate Terrain X which is primarily a vector scenery product. Once you fly out of the photoscenery coverage area Ultimate Terrain X scenery will take over.

Q: Can I use Ground Environment X with Ultimate VFR?

A: Yes. Ground Environment X is a tiled imagery scenery enhancement. Ultimate VFR is a photoscenery product which overlays Ground Environment X scenery tiles which is primarily a tiled image scenery enhancement. Once you fly out of the photoscenery coverage area GEX scenery tiles will take over.

Q: Can I use my airport add-on from another developer?

A: Yes. All airports developed by quality developers who utilize aerial imagery for the design of their airport should be compatible. If there are any incompatibility issues please contact us via our Ultimate VFR Facebook support page at <http://www.facebook.com/groups/ultimatevfr>. We are more than happy to assist you and other developers with any compatibility issues.

Q: Can I use elevation data from FS Genesis, FS Global or another developer?

A: Yes. Ultimate VFR is a photoscenery product and primarily provides aerial imagery that overlays (or drapes) over other scenery layers in Microsoft Flight Simulator X. The Ultimate VFR experience will be further enhanced by high quality elevation data from 3rd party vendors. We personally use and highly recommend the FS Genesis elevation datasets.

Q: Why are autogen trees sometimes problems in urban areas?

A: As we are developing custom solutions for autogen vegetation in FSX, we are limited by the resolution of currently available source data. This development cycle requires an extraordinary amount of computer processing power and time to generate. Current

autogen vegetation for Ultimate VFR should be considered a preview at this point in time. As we develop our technology further we will release updates to improve our autogen layer for end users. If there is an area of major concern please sign up and verify customer details at <http://www.facebook.com/groups/ultimatevfr>.

Q: Do you provide seasonal variations?

A: At this point in time we don't offer seasonal variations, except those seen through the FSX 3D autogen vegetation layer. As each base photoscenery product is 1-100 Gigabytes in size adding extra seasons would become far too large for customers to obtain easily. Each area would require 4 to 5 times more hard drive space than our base photoscenery layer. It would also increase the price of the photoscenery 4-5 times due to server and product delivery costs. Alongside of this we firmly believe in being true to life and not faking different seasons or manipulating the full color spectrum of the imagery which would result in image degradation.

Q: Why are there color variations between some states?

A: The U.S. NAIP program images about 50% of the United States on alternate years. In the past numerous different aerial imaging companies have used a range of digital and film cameras, lenses, film stock or digital imaging sensors. As such there are variations from imagery produced from one company to another. In recent years this has become less of an issue as photographic film has been phased out in favor of digital capture technologies and fewer companies are generating these datasets but are covering a greater amount of states in their contracts. On the post-processing side for use with Microsoft Flight Simulator there are limitations in terms of current computing power for datasets that are in the order of PetaBytes in size uncompressed. Basically in the range of super computers.

Q: Do you provide photoscenery edge blending for each state/county?

A: At this point in time we don't provide edge blending with Ultimate VFR Utah, however we are hard at work to add edge blending to our photoscenery products. As edge blending on a county by county basis is quite time consuming we feel that time is better used expand coverage to include all of the United States rapidly. We will be adding edge blending in future via updates to Ultimate VFR.

Q: I'm getting bad frame rates, what could be the problem?

A: Photoscenery actually reduces the load on the computers and you should, in normal circumstances see an increase in frame rates due to the real world having fewer trees than the default FSX scenery tile with autogen system. If you do find you are experiencing frame rate issues in FSX it's not likely to be caused by the photoscenery. However users can fine tune their installation of FSX by reducing the memory demand in FSX. Whenever display settings are set too high in FSX and exceed physical RAM and Graphics Card Memory the

computer will kick into virtual memory mode (i.e. page swapping) by utilizing your hard drive to write the excess memory to. There are programs like memstatus 2.0 and videocard monitoring programs that will tell you your FSX memory use while it is running and will help you determine whether your settings are asking more from your computer system than it can comfortably handle. At our support pages and blog we will post information about how to properly optimize FSX for best performance.

Q: Why aren't the autogen trees not accurate to the real trees I see outside?

A: Microsoft Flight Simulator X has generic autogen tree types, groupings and mixes which only cover a limited amount of vegetation types that exist in the real world. We make every effort to ensure the autogen vegetation you see in FSX is as close to the types of vegetation you'll see in the real world. Our advanced autogen technology that is currently in development should address these issues once we are code complete.

Q: Why are there so few Autogen Buildings in certain areas in the United States?

A: Source data availability is key in this area. While Europe has a lot of publicly accessible building footprint data, the United States does not. As more and more source datasets become available we will implement them into our autogen layer. This is an area we expect significant growth to occur in over coming years.

Q: What's the deal with water flattens & water excludes?

A: FSX has some limitations in the way it handles water in it's new round earth model. As the earth is a curved surface developers have a choice of either creating elevation mesh clinging water (which is not very flat) or creating water flatten polygons to flatten out the terrain underneath (which can lead to water plateaus). Both techniques have their advantages and drawbacks. We currently do not provide water flattens for inland areas due to the plateau effect which we find is very obvious. We recommend users turn off water flattens in FSX via the terrain.cfg file or Ultimate Terrain X (UTX) from Flight 1 and Scenery Solutions. Ultimate VFR is designed with UTX in mind.

Q: Do you provide landmarks for Ultimate VFR?

A: Yes, where possible we like to add as many landmarks into our scenery as possible. However it is not our primary focus. We have designed Ultimate VFR to be a base layer upon which other freeware and commercial add-ons can build upon. We do however have plans for further enhancements to our Ultimate VFR product lines in future.

Q: Is Ultimate VFR compatible with other Autogen products?

A: Yes. Ultimate VFR's autogen will be compatible with other autogen enhancement products. However our autogen will need to be turned off in order to use a 3rd party autogen system.

Q: There is a bug with some of the Autogen roof textures, can this be fixed?

A: FSX has a bug with some of the autogen building texture mapping for large flat roofs. Sometimes large flat roofed buildings will display a double chevron gable texture which clearly should not be there. We are working on a solution to this and are seeking to find out which FSX file is causing the bug so we can produce a patch for it.

Q: What can I expect to hear from the Ultimate VFR Guam Sound Environment?

A: We have included numerous sound effects which are audible within Ultimate VFR Guam. These sounds Include: Airport Parking Lot Ambiance, Airport Tarmac Ambiance, Birds, Buoys, Cargo Ships, Cruise Ships, Cruise Ship Horn Blasts, Dogs, Dolphin Chuffs, Golf Driving Ranges, Go Karts, Hangar Ambiance, Kayakers, Marina Ambiance, Baseball Games, Tennis, Tugboats, Waverunners and Waves.

Q: How can I download Ultimate VFR quickly and error free?

A: We highly recommend Free Download Manager, available from www.freownloadmanager.org. This is both a download accelerator as well as a download manager. We have been utilizing this tool for nearly ten years and will allow you to download our products at maximum speed and without errors.

Q: Can I install Ultimate VFR on any drive?

A: Yes. Ultimate VFR is designed where you can choose which drive and directory you would like to install into during the installation process. Our installer will automatically activate the scenery within your FSX scenery library. If you choose to move your scenery install to another drive after you have run the installer, you will need to edit the entry in your scenery library menu option within FSX and point it to the new drive and folder.

Q: Can I install Ultimate VFR counties at the same time?

A: Yes. You can run multiple Ultimate VFR scenery installers at the same time, however it will place extra demand on your hard drive writing head mechanisms and is not recommended. However if you do, it would be best to defragment the hard drive you installed Ultimate VFR on once you have completed installation. This will help ensure your scenery load times are fast and you don't run into blurries during runtime within FSX.

Q: Do you provide night lighting?

A: Ultimate VFR Guam currently includes night lighting with High Pressure Sodium, Sodium Vapor, Mercury Vapor and Silver Halide style night light effects. Our night lighting system technology is currently being upgrade to version 2.0 which will provide enhanced effects and will be released once we are code complete.

Q: Where does the source imagery come from?

A: We only utilize public domain data sources from the United States government and other public domain data sources. U.S. Mainland imagery used is from the USDA National Agriculture Imaging Program (NAIP) program and the U.S. Aerial Photography Field Office (AFPO).

Q: What software do you use to generate the scenery for FSX?

A: We utilize high end film and television software packages to generate and edit all our Ultimate VFR imagery. With Dean's background in film & television production Mission Aware Technologies has access to high end tools that are not available to most home users. Mission Aware Technologies also has specialized software that we have developed in-house that allows us to generate over 85,000 sq mi (220,000 sq km) of photoscenery per week.

Q: Where do I go for support?

A: Our support page is available at our Facebook Ultimate VFR Support Group page. We have decided to go with Facebook Groups as we are able to provide support only to verified customers of Ultimate VFR and our experience has shown forum software tends to be frequently exposed to hackers and spam bots. Our page can be found on Facebook at <http://www.facebook.com/groups/ultimatevfr>. You will need to request access to the group in order to obtain support, we will need to confirm your order and customer details before granting access.

Q: Can I order Ultimate VFR via phone?

A: Yes. We will be happy to take your order via telephone. To prevent fraud we will need verification of your identity before we can process your order if paying by credit card.

Q: Can I order Ultimate VFR via mail?

A: Yes. We will be happy to take your order via mail. To prevent fraud we will need verification of your identity before we can process your order if paying by credit card.

Q: Can I order Ultimate VFR on USB thumb drive?

A: Yes. We believe USB is the safest, fastest and most cost effective way for us to ship a hard copy of your Ultimate VFR order to you. We are able to provide Ultimate VFR products on USB discs (ranging from 4GB to 64GB depending on the size of the state ordered) for the cost of the USB, shipping, handling and insurance. Please note the discs will be shipped from Australia and could take some time. If you are anxious to start using our add-ons right away you will also be able to download a digital version via links in your order page or email.

Q: Can I order Ultimate VFR on hard drive?

A: Yes. We can provide Ultimate VFR scenery on hard drive for the cost of the hard drive plus shipping and insurance. Note as the hard drives will be shipped from Australia and could take time. Please call us for a customized solution if you'd like to order our products on hard drive. If you are anxious to start using our add-ons right away you will also be able to download a digital version via links in your order page or email.

Q: Can I order Ultimate VFR on BluRay?

A: Yes. We are able to provide Ultimate VFR products on BluRay 25 & 50 discs for the cost of the discs, shipping, handling and insurance. Please note the discs will be shipped from Australia and could take some time. If you are anxious to start using our add-ons right away you will also be able to download a digital version via links in your order page or email.

Q: Can I order Ultimate VFR on DVD?

A: Yes. We are able to provide Ultimate VFR products on DVD dual layer discs for the cost of the discs, shipping, handling and insurance. As these products are tens of Gigabytes in size DVD count could be as high as 10 dual layer discs. Please note the discs will be shipped from Australia and could take some time to generate. If you are anxious to start using our add-ons right away you will also be able to download a digital version via links in your order page or email.

Q: I am a scenery developer for Flight Simulator can I get involved?

A: We are constantly on the lookout for quality developers to join our development team at Mission Aware Technologies and sell their compatible scenery products under our banner. We offer you competitive incentives and unique strategic business partner arrangements that will be mutually beneficial. Joining the Mission Aware Technologies family means you will have access to team resources, licensing, technologies and tools that that we can all benefit from.

Appendix

Known Issues

- Airport & Facilities Data for Guam Airports needs work on the approach modeling. As the default FSX airport & facilities were off from their real world location we had to shift the airport and navigation aids to match their real world locations. Most are lined up correctly however one user reported that there are some anomalies on the approach. We are yet to confirm this.
- Airport, Tumon & Tamuning Buildings are not custom buildings. As we are photoscenery developers and not modelers we have utilized default FSX buildings that are the closest match to the buildings in real life. We are hoping to model the real buildings in time and are interested in 3D building modelers to join our team.
- Autogen buildings are missing. Currently there is no available commercial or public data for building footprints on Guam. We are investigating possible solutions to bring autogen buildings to Ultimate VFR Guam.
- Night lighting is not as advanced as we have planned. This is due to performance issues with average to low end computer systems. Our new night lighting technology is still in development which will provide a much more enhanced experience once it is ready.
- Color correction has been pushed to the limit. The original source imagery for Guam was extremely blurry, muddy and dark. We have gone through several iterations of color correction to get it to an acceptable level. We do have plans to go through another set of processes to enhance the color correction further however.

For any other issues or for technical support please contact us via our Facebook Support Page:

<http://www.facebook.com/groups/UltimeVFR>