ossimPlanet Users Manual

An accurate 3D Global Visualization System

Version 0.5 2 Mar 2007

Overview

ossimPlanet is an accurate 3D global geo-spatial viewer that is build on top of the OSSIM, OpenSceneGraph, and Trolltech QT open source software libraries. It provides native geo-spatial access to a wide range of commercial and government data formats with high the high performance visualization and collaboration capabilities. ossimPlanet is one of the key components of the Large Data Joint Capabilities and Technology Development project. This document describes the installation and use of ossimPlanet.

Requirements

ossimPlanet currently requires a 3 button mouse for navigation.

Mac OS 10.4 or later is required. ossimPlanet is a universal binary that runs natively on both PowerPC and Intel-based Macs. The installer provides all of the required frameworks and dependencies which include:
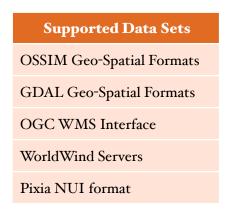
OpenSceneGraph 1.2.2-2 or later

Trolltech QT 4.1.4 or later. Note that there is a performance degradation with Qt 4.2. The binary release uses 4.1.4 until the performance issue is resolved
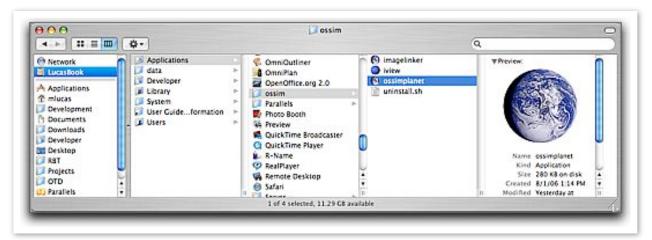
Installing ossimPlanet

Binary installers are available for various platform including MacOSX, Windows, and Linux. Double click on the Installer package and follow the instructions. The binary installer contains all of the dependencies need to run the program. It installs three double clickable applications in /Applications/ossim. Frameworks and supporting files are installed in appropriate system locations - /Library/Frameworks and /Library/Applications Support/ossim. Additionally, several command line utilities are installed in /usr/local/bin.
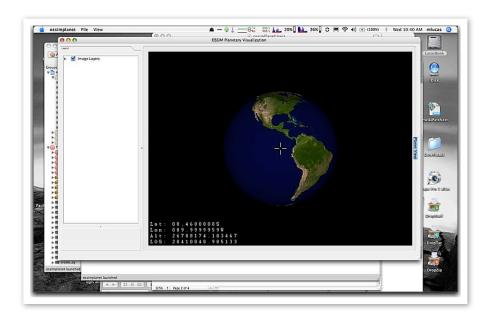
Supported Data Sets
OSSIM Geo-Spatial Formats
GDAL Geo-Spatial Formats
OGC WMS Interface
WorldWind Servers
Pixia NUI format

Operating ossimPlanet

Running ossimPlanet

ossimPlanet is installed as a double clickable application in the Applications folder in an ossim sub-folder. Navigate to /Applications/ossim/ossimPlanet and double click the ossimPlanet icon to start the program.

Starting ossimPlanet from the Finder

ossimPlanet startup

If the program is properly installed, a display similar to the one shown above will appear after double clicking the ossimPlanet icon in the Applications/ossim directory.

getting some data

Some sample data sets are available at http://ossim.telascience.org/ossimdata . ossimPlanet can also fetch data from OGC WMS servers or NASA Worldwind servers.   If you installed with the binary installer a copy of earth.xml has been installed in /Library/Applications Support/ossim/files/ WorldWind - alternatively you can download the same file from the link above and the Data directory. Drag and drop this xml file into the legend area of the planet to trigger the setup for multiple WorldWind layers. By default all of the layers are enabled, you will want to deselect and view the layers one at a time to fetch and load various imagery and map layers from the remote server. You will need internet access for this to work.

Navigating

The current version requires an external 3 button mouse for three dimensional navigation of the planet.

Note: You will want to disable dashboard activation on mouse clicks from the Systems Preferences Dialog. Under the Apple menu, select the Dashboard and Expose dialog to change the default settings. Make sure the Dashboard isn't invoked on mouse clicks as it will intercept navigation controls to ossimPlanet. Also set the mousebutton mapping in the mouse control to a standard 3 mouse button configuration.

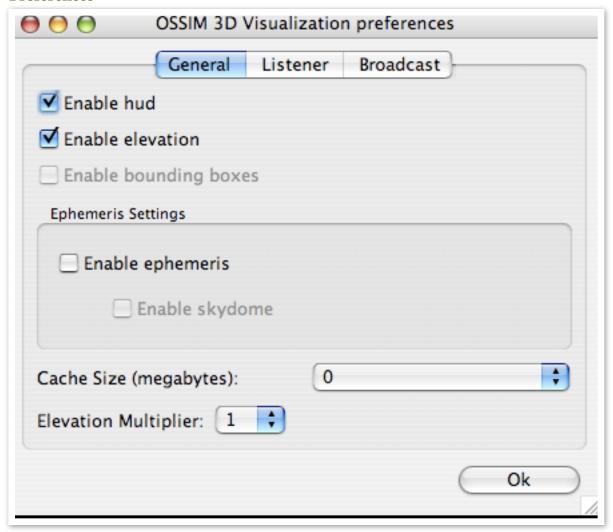| Event	Action
Left mouse drag	rotates the globe
Middle mouse drag	Rotate around center of interest
Right mouse drag	Zoom in and out to center of interest
Shift Middle mouse drag	Moves up and down (elevator mode)
Shift Left mouse drag	Pivots around eye point
Space Bar	Resets view to default position
w key	Toggles between textured, wire frame, and point modes
l key	Toggles directed light source (currently disabled)
Apple F	Toggles full screen mode
Apple ,	Brings up preferences panel
Arrow keys	Starts constant rotation (accumulates with additional key presses)
z	Start recording path
Z	Stop recording path, playback and loop until interrupted by user input
Return Key	Freezes all motion

Menus and Menu Items

This section describes each of the menus and menu items in ossimPlanet.

ossimPlanet

Under the ossimplanet menu the following items are available:

Preferences

The preferences modal dialog allows the user to enable various features of ossimPlanet. The preferences has multiple tabs at the top to select the available views. Clicking the **General** tab displays the following options:

Cache Size (megabytes):

Pull down menu that sets the size of the ossimPlanet memory cache. Defaults to zero, use this to set the size of your memory cache to increase performance.

Enable HUD -

Enables the Heads Up Display (HUD) for ossimPlanet. The HUD includes the cross hairs at the center of the image and the latitude, longitude, elevation, and height readout at the bottom left hand corner of the display.

Enable bounding boxes
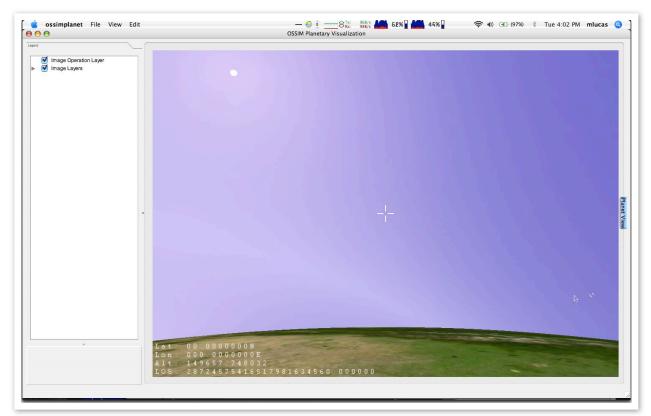
(Currently disabled)

Draws a red bounding box around the data sets in each layer.

Enable elevation

Turns on or off elevation processing for topographic relief and visualization in ossimPlanet. Elevation processing requires that elevation data sets be staged through the Application Support directory for ossim. DTED and SRTM file structures for elevation can be automatically parsed and retrieved by the software. See the section on staging supporting data sets in this document for setup details.

Enable Ephemeris

This checkbox enables the osgEphemeris library. If this option is enabled, the system date and time as the well as the viewers location are used to render a view of the heavens. Currently this sky dome only toggles on when the eyepoint is close to the surface of the planet. This includes a starfield on the night side of the planet and a blue sky dome on the lit side. The sun and the moon are rendered in their relative positions. **(Ephemeris is currently disabled)**
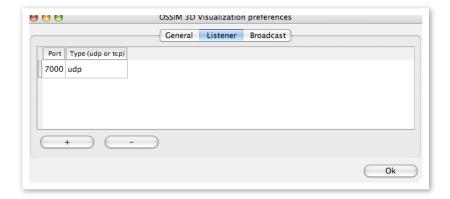

With osgEphemeris enabled showing relative sun and moon positions against sky dome.

Elevation Multiplier

A pull down menu applies an elevation scaling factor. The higher the number, the more exaggerated the topography..
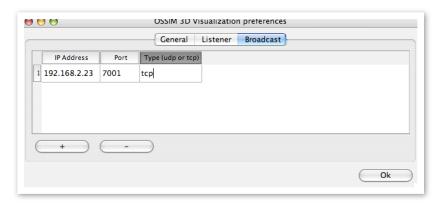
Listener Tab

The Listener allows the user to open up tcp or udp ports for remote control and messages. The first column is the port number, the second column is the maximum number of connections. ossim-Planet will listen on these channels for commands and respond accordingly. The simplest use is to sync up the navigation of multiple planets - the broadcast channel will transmit position information to the IP address ossimPlanet application listening on the same channel.

Broadcast Tab

The broadcast tab reveals the set up for ossimPlanet command broadcasting. Position and orientation commands are transmitted to all listening ossimPlanets through these open channels. Channels can be added or removed in this dialog. For navigation commands we recommend using udp for higher performance. To set up a broadcast channel enter the tcp or udp address broadcast port fill out the entry fields in this dialog:

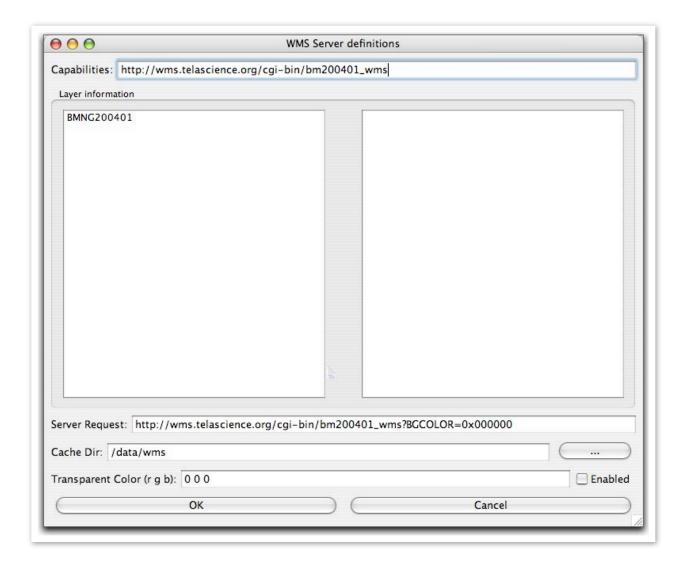Broadcast port setup

File Menu

The file menu contains the menu items for loading imagery into ossimPlanet.
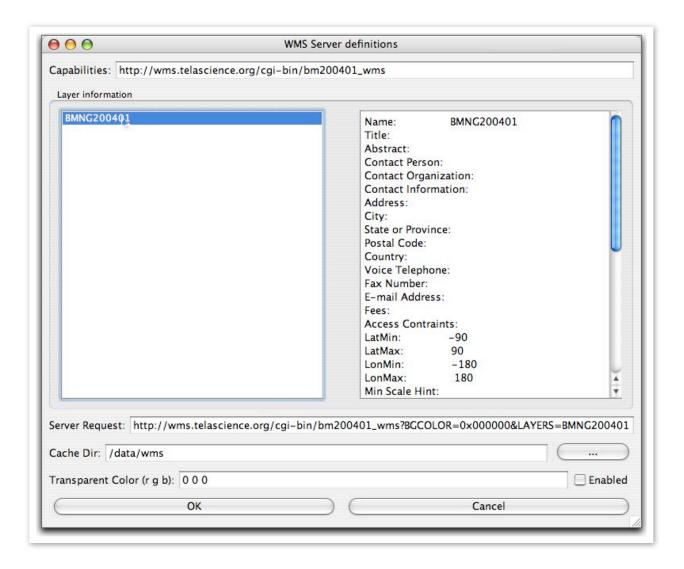
Open Image

The Open Image menu item is used to access and load geo-spatial data files into the planet. Most commercial and government geo-spatial data formats are supported. ossimPlanet also supports drag and drop capabilities from the operating system onto the layer panel. For a complete list of supported files refer to the ossim and GDAL project documentation.

Open WMS

The OGC Web Mapping Services interface is supported in ossimPlanet. The menu item will open a dialog box for getting WMS access to online servers.

Entering a WMS Get Capabilities string will return the available layers from the remote server and set up a default Server Request string. Clicking on the layers will reveal additional information about that layer, double clicking will add the layer to the Server Request String. It is also necessary to set up a local cache directory to store the data once it is retrieved from the remote server. Enter the directory in the Cache Directory field or navigate to a particular directory with the button on the right.

Once the request and the cache directory are set up press the Ok button to begin to retrieve the specified layers. The legend should reflect the new WMS layer as shown in the example below.
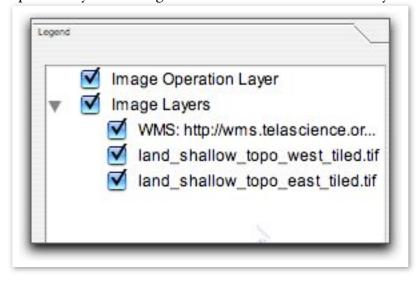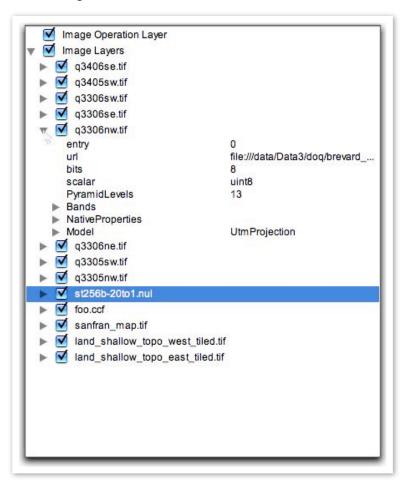
Image layers are also used to display associated meta data. Meta data tags are automatically parsed and displayed with their associated values in the legend area. Simply open the reveal triangles next to the images to reveal the metadata.
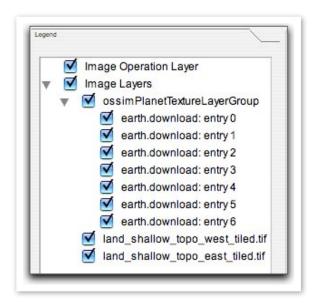

Drag and Drop support
ossimPlanet also supports drag and drop from the desktop into the Layer panel.

Loading WorldWind Servers
Direct downloading from WorldWind Servers is also supported. Included in the distribution is an earth.xml file. This file is located in /Library/Application Support/ossim/files/Worldwind/earth.xml. Opening this file or dragging it into the legend area will open download channels with several WorldWind servers and layers. These layers will be added under Image Layers in a sub-heading named ossimPlanetTextureLayerGroup as shown below. Expand the disclosure triangle to toggle on or off the display of these layers. As you navigate the globe data from these servers will be downloaded and displayed given your viewing area. Note, this also will work in the other included applications - imagelinker and iview.

Open Session

A Session is an xml file that contains the state of the program including data that has been loaded and the currrent view. The Open Session command retrieves this file from disk, loads the data, and navigates to the saved view.

Open Placenames

Placenames saved from Google Earth in either kml or kmz format can now be directly loaded into ossimPlanet. Simply drag and drop the kml or kmz file to the layers area and they will be loaded. Click the disclosure triangle to open the placenames - double click any placename to navigate to that location.
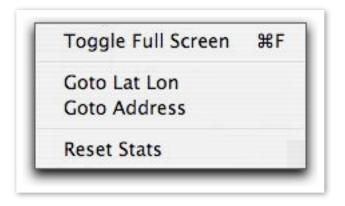
Save

The Save command saves a session given the current state and view of the program. The first time it is run it will prompt the user for a name, subsequent saves will simply overwrite the file with the new state.

Save As...

The Save As.. command will open a dialog for saving a session and prompt for a new file name. Use the Save As... command to save additional sessions.

View Menu

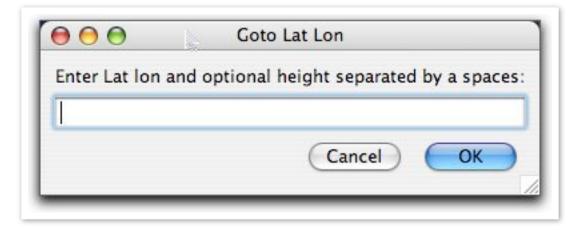## Toggle Full Screen

Selecting this menu item or pressing the Apple F key combination will toggle the display between full screen and windowed view.

Goto Lat Lon

Entering a Latitude, Longitude and optionally an altitude will navigate to that position.

Goto Address

(Not fully implemented) This menu item provides address geocoding. It converts and street address into a latitude and longitude and then navigates to that point.
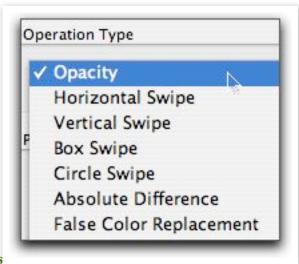
Reset Stats

Selecting this menu item will zero out the loaded texture count and percentage in the status line of the main display. The status line shows how much data has been attached, how much texture has actually been loaded, and the percentage.

Total Texture Size = 13058.5 MB Total transferred = 250.729 MB Percentage = 1.92005%

Edit menu

Layer Operations

This menu item implements various layering transitions in ossimPlanet.

These include the various swipes, blends, and change detection algorithms that are shown in the dialog pop up menu shown below. All of these operations are performed in the the Graphics Processing Unit (GPU) and operate on multiple OpenGL textures.

The Layers in the Legend panel are divided into two sub-categories - Reference and Layer. Individual image layers can be arbitrarily ordered and moved between these layer categories. ossimPlanet collapses each category into OpenGL textures for the operations.

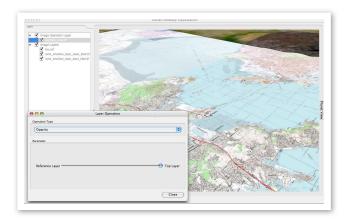**Top**

Selecting this option will display only those layers that have been positioned in the layers operations subfolder in the Legend panel.
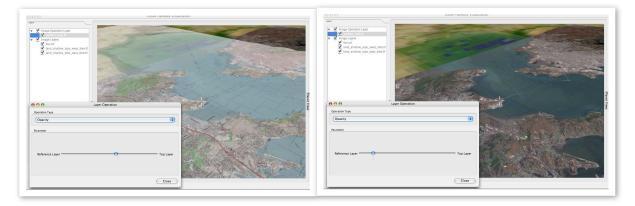
Reference

Selecting this option will display only those layers in the reference subfolder of the Legends panel.

Opacity

The Opacity of the operations layer is adjusted with the slider performing a blending operation with the reference texture.
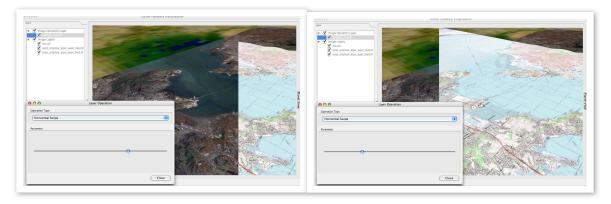
The map layer is totally opaque with the slider control on the right. Moving the slider back and forth will change the opacity of the top layer revealing the reference layer underneath.

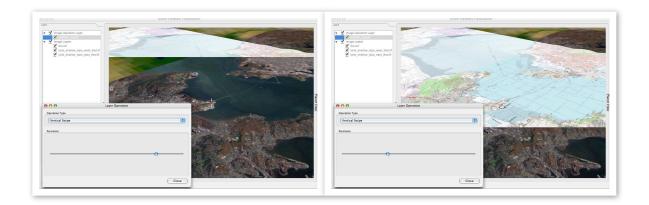Blending set so that the reference layer dominates the blend.

Horizontal Swipe

The application contains several swipe modes for revealing the reference layers under the operations layer. The Horizontal swipe mode moves a horizontal edge back and forth over the two textures as shown in the two examples below:
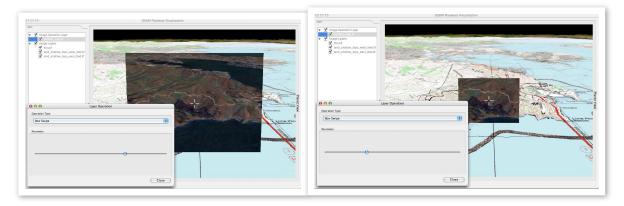

Vertical Swipe

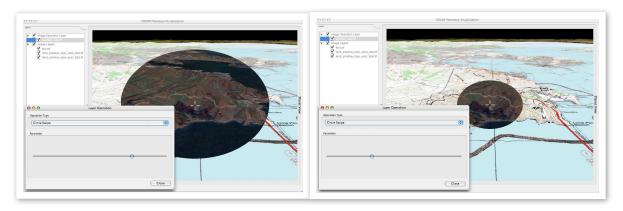The vertical swipe operates in a similar fashion with a vertical edge.

Box Swipe

The box swipe mode sets up a rectangular reveal area at the center of the view display. Moving the slider enlarges and collapses the rectangular reveal area.

Circle Swipe

The circular swipe mode sets up a circular reveal mask that expands and collapses as the slider is adjusted.

Absolute Difference

The absolute difference mode performs a simple pixel subtraction between the top and reference layers and displays the deltas between the channels. Therefore if the top and bottom images are equal the result would be a black image.

False Color

The false color mode is constructed by converting the reference and top layers into grey scale and mapping the takes the gray scale of the top layer and puts it into the green channel of the resulting image.

red - gray scale of bottom

green - gray scale of top
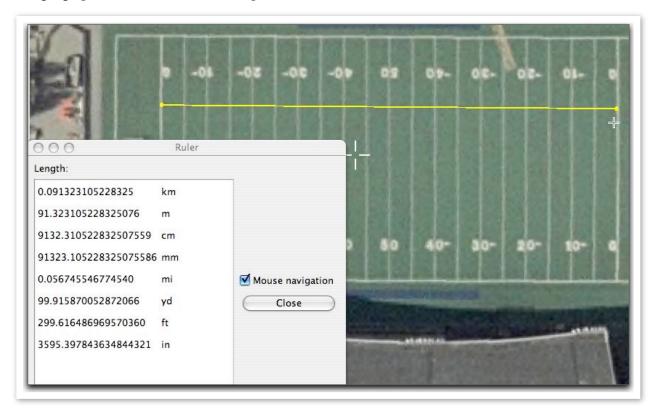
blue - gray scale of bottom

Window Menu

The Activity menu item calls up a floating dialog that displays processing activity in the various processing threads. The display will show background loading of files and generation of overview layers when they are not present.

Tools Menu

The Ruler menu item places ossimPlanet into mensuration mode. Two points can be selected and the geographic intersections with the planet will be used to calculate the distance in between.

In the above example two clicks were made on each goal line. The dialog displays the calculated distance in various units. When Mouse navigation is selected the user clicks at the desired end points.

If Mouse navigation is not selected - drag and release between the two points to indicate the line. The close button will terminate the ruler mode and return to normal navigation.

System Locations - MacOSX

Default data sets for imagery and elevation, and dynamically loaded plugins are installed in standards system locations.   These locations should be used to add default elevation trees, background textures, and new loadable plugins.

/Library/Application Support/ossim

> geoids
>
>> geoid1996
>
> elevation
>
>> link to top of elevation tree
>
> images
>
>> reference
>>
>>> files or links
>
> plugins
>
>> libossimgdal_plugin.dylib
>>
>> libossimnui_plugin.dylib
>>
>> libossimreg_plugin.dylib
>>
>> libossimworldwind_plugin.dylib
>
> files
>
>> Worldwind
>>
>>> earth.xml

~/Library/Application Support/ossim

About OSSIM

ossimPlanet is part of the OSSIM open source software project located at http://www.ossim.org .

About the Large Data JCTD

The Large Data JCTD is a three-year initiative that will demonstrate the integration of technologies and operational concepts to significantly improve the deployed joint warfighter's situational awareness by enabling rapid access, integration, and display of very large heterogeneous data with special emphasis on fusing geospatially and temporally referenced data. The effort will conduct spiral demonstrations leading to Joint Military Utility Assessments (JMUA) for this advanced "large data-to-the-warfighter" technology concept, and transition the technology to organizations and/or programs of record. To the extent possible, open technologies and open source software will be used in the development of this capability.

About RadiantBlue Technologies Inc

Founded in 2005, RadiantBlue Technologies is a small business headquartered in Colorado Springs with regional offices in Chantilly,   VA and Melbourne, FL.

RadiantBlue develops and integrates intelligent information technology applications that support our customers' high priority needs and emerging capabilities in countering terrorism and protecting our country.

RadiantBlue provides development and support for the OSSIM baseline.

Additional information is available at http://www.radiantblue.com

Version	Date	Comments
0.1	18 oct 2006	Initial release coinciding with 1.6.6rc7 - mlucas
0.2	25 Jan 2007	Updating to the 1.6.6rc16 release - mlucas
0.3	8 Feb 2007	Added alerts and remote navigation
0.4	2 Mar 2007	tcp/udp communications, new manipulator modes, set path and loop (rc19)
0.5	14 Mar 2007	Shift modes, initial kml/kmz file support 1.6.6rc21 release