

Using SRTM Water Body Data In Flight Simulator Applications

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Earlier this year, the USGS released Shuttle Radar Topography Mission Water Body Data (SWBD) for public use. The data was developed from satellite imagery and ancillary data, to improve the quality of the Shuttle Radar elevation data along shorelines and across larger bodies of water.

This data can be incorporated by developers to generate terrain scenery for flight simulation applications.

This data set is probably the first freely available water boundary data set, covering a global region, at a resolution scale better than 1:1,000,000. We will use the term “global” in this document. But, the actual “global” coverage area of the SWBD data is between N60 and S60 latitude.

Unfortunately, there are many drawbacks to this data set, which make it a poor choice for high-quality scenery packages for flight simulation applications.

This document will highlight some of those drawbacks by comparing SWBD data to some commercial source data.

Accuracy

The SWBD data provides the most accurately positioned, freely available global data today. By accuracy, we mean the placement of the coastlines in relation to their real world locations.

This means that larger bodies of water will be positioned more accurately than with any other freely available global water data.

The problem with using SWBD data, lies not in the accuracy of the data, but in other areas that affect the visual impact of using the data in flight simulation sceneries.

The issues include:

- The number of water features that are present.
- Coastline precision (what the coastlines look like within the simulator itself)
- Coverage limited to areas between N60 and S60 degrees latitude.

In this document, we will compare the SWBD data, with commercial water data available from TeleAtlas.

Number Of Water Features Present

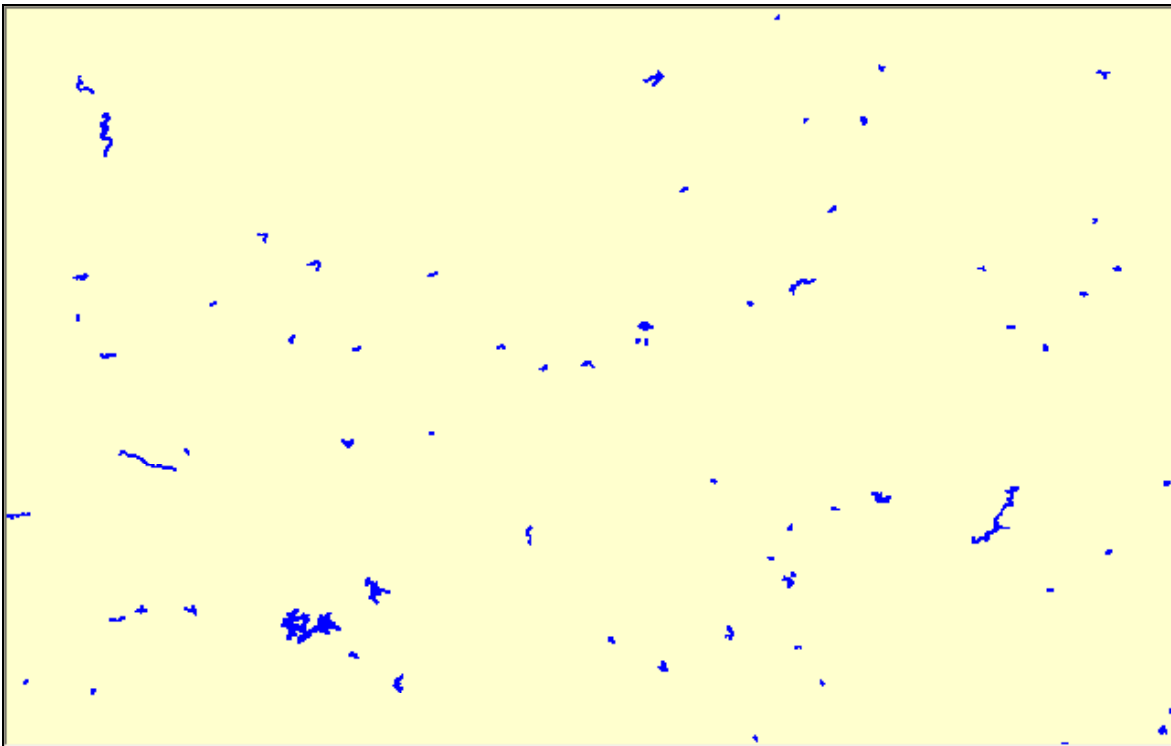
The number of water features that are present is one area where the commercial GIS data has a strong advantage over the SWBD data.

For comparison purposes, the following sets of images compare a portion of France, using both the freely available SWBD data, and commercial water data licensed from TeleAtlas.

With the SRTM data, only lakes greater than a 600-meter minimum length and 183-meter minimum width requirement are included. Lake inlets (arms) are included if the inlet/arm reaches a width of 90m.

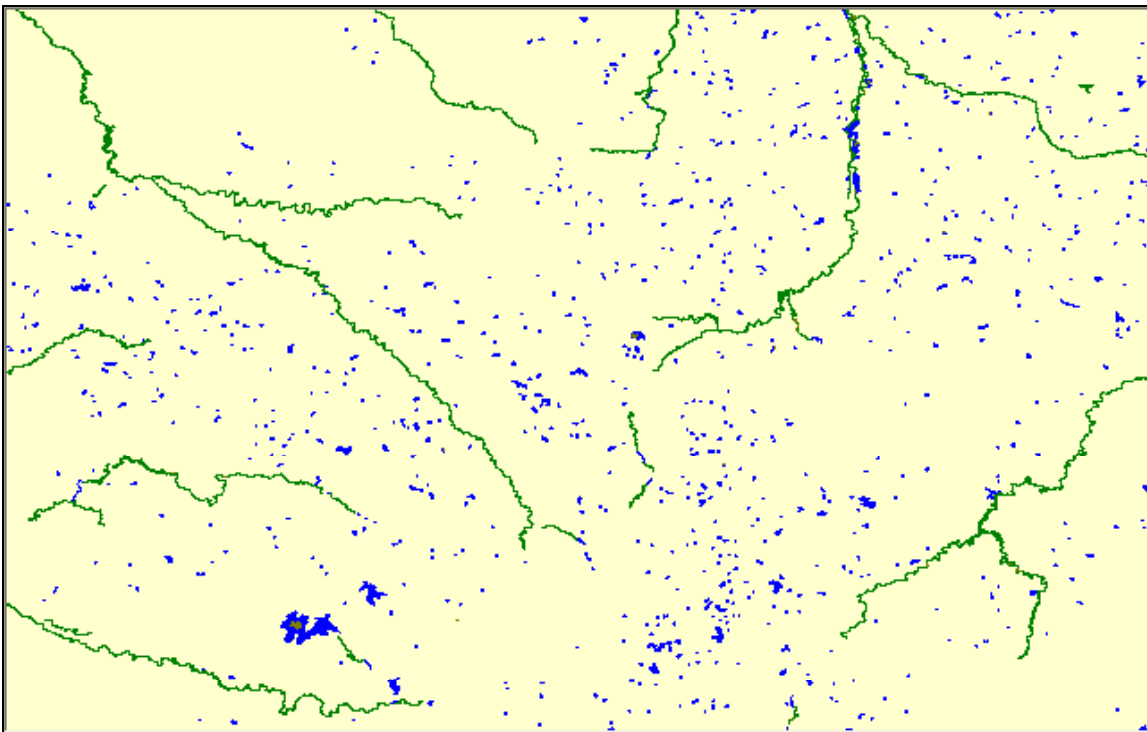
SWBD Water Data

First, here are the SWBD water features included for an area of France roughly 120km x 100km in size. In general, many areas are rather sparse in nature. Still, this is an improvement over the default water bodies currently included in FS9.



TeleAtlas Water Data

Here is the same area from the commercial TeleAtlas data set. This data set also contains river polygons (green), in addition to the lakes. The difference in the number of water bodies is obvious.



Coastline Precision Of Water Features

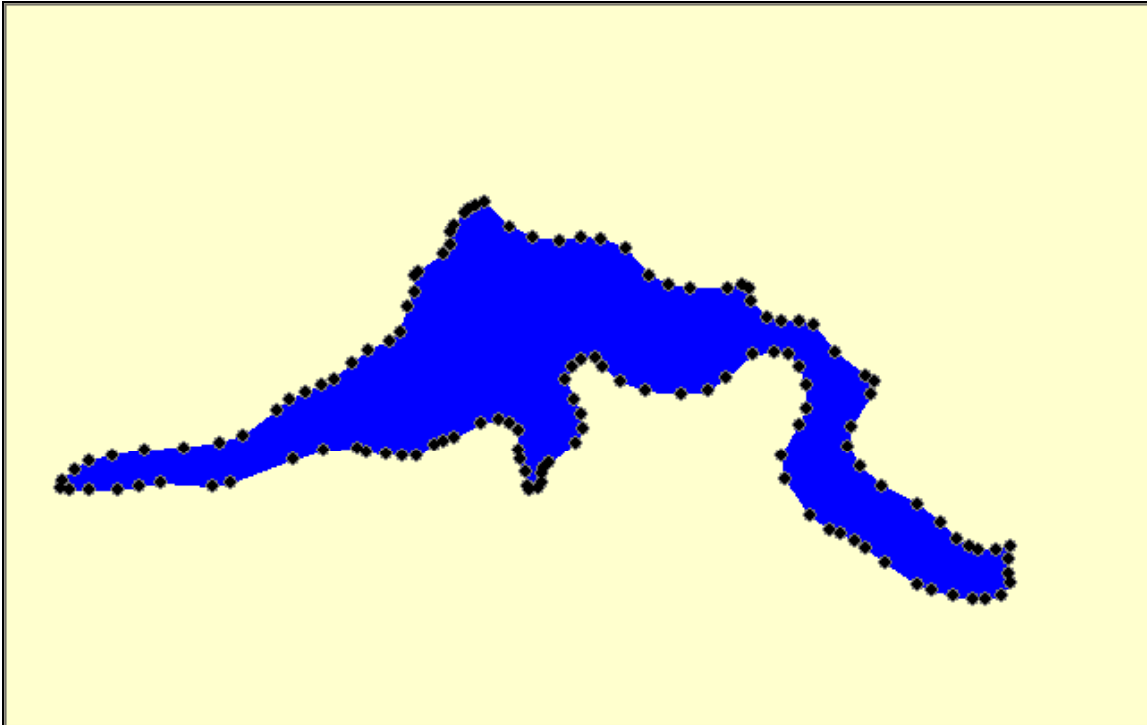
This area presents what is probably the biggest drawback to using SWBD data in flight simulation applications.

The more data points that are used to draw water feature shorelines, the better the water will look in a 3D, or even 2D application.

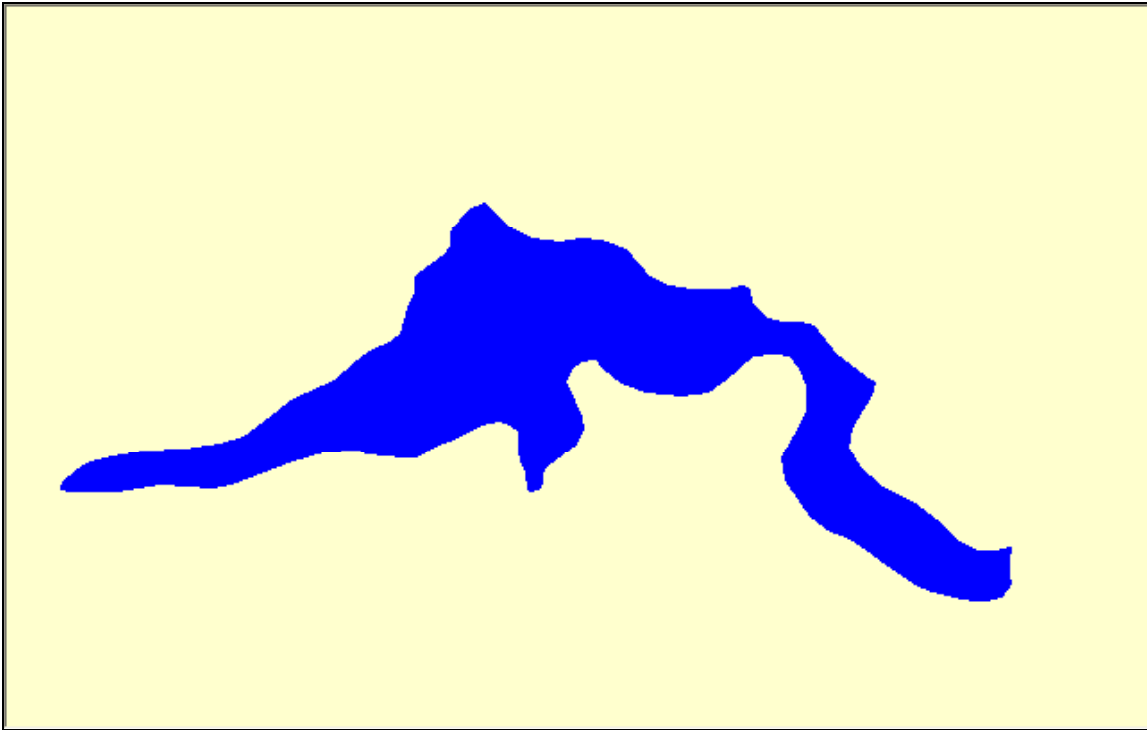
Having more points allows the contours of the coastline to follow it's natural path, instead of providing a choppy or blocky coast.

Lake Drawn With TeleAtlas Data

Here is an image showing a close-up view of a small lake using the TeleAtlas data. The large number of data points (black dots) used to define the lake shoreline, allow for the display of a coastline that is both accurate and smooth.

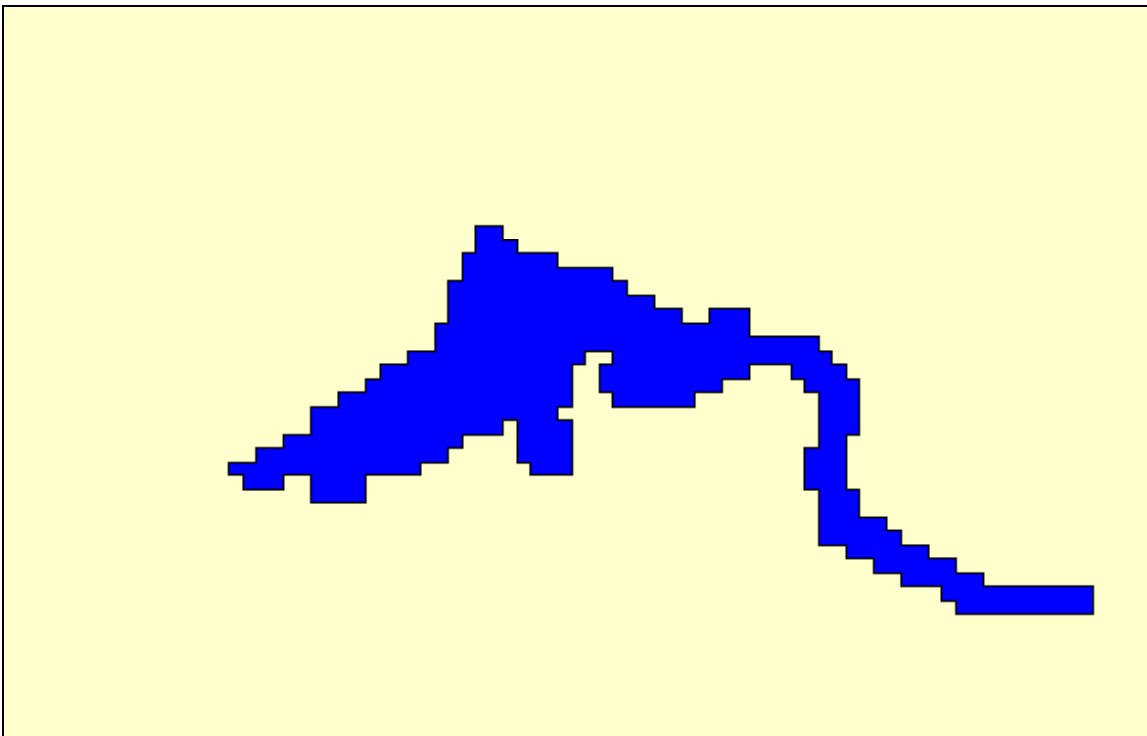


Here is the same shot with the individual points turned off



Same Lake drawn Using SWBD Data

In Contrast, the SWBD water data are derived from raster images as a series of 30m x 30m posts (kind of like large pixels). As a result, water features drawn within the Flight Simulator application, without further processing, will display these choppy coastline “sawtooth-like” characteristics.

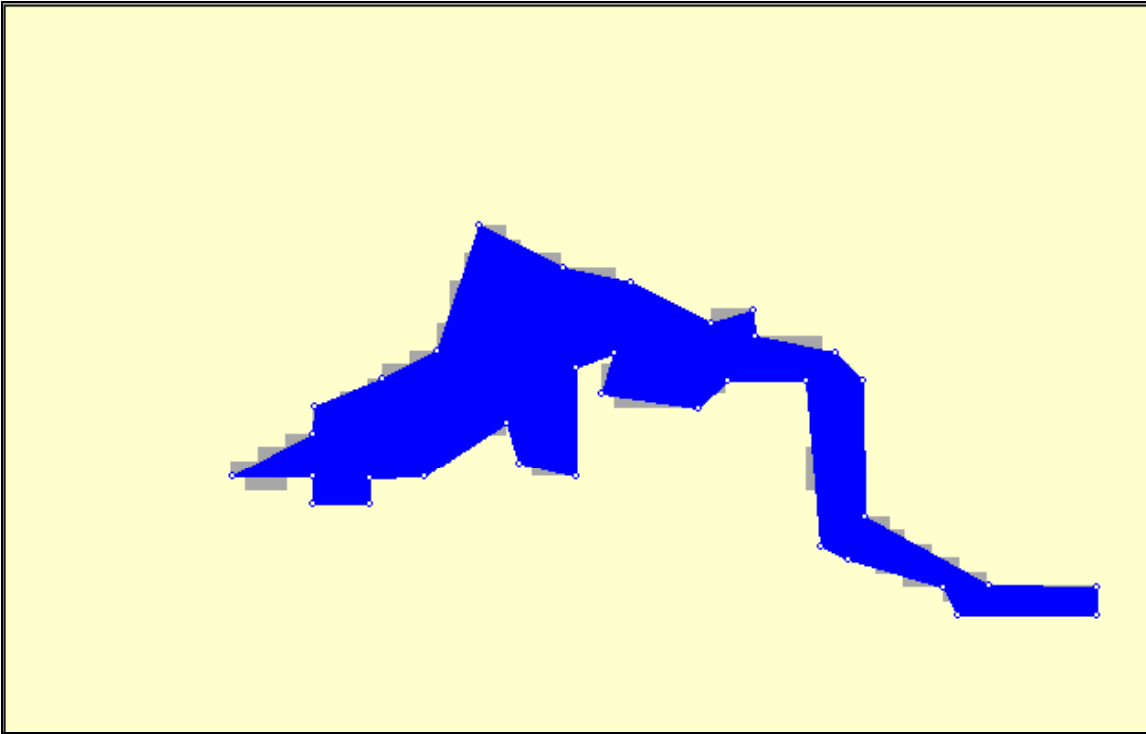


Thus, the shorelines of SWBM data need to be smoothed, or otherwise processed, before use in Flight Simulator.

There are a variety of vector processing software packages that can be used for this purpose.

However, smoothing the shorelines will result in a reduction of accuracy and coastline precision.

The image below demonstrates what occurs when the SWBM data is “smoothed” for simulator use.



You will notice that the smoothing of the coastlines removes the blocky appearance, but we are now left with a much less precisely drawn water feature.

The white dots in the SWBD image above show the number of data points after smoothing the rough edges.

Compare the number and positions of white dots/points above, with the black points/dots in the TeleAtlas data. More source data points provide for a much smoother coastline, without sacrificing accuracy.

For more information on SWBD data, you can visit the SWBD product guide, which is distributed by the USGS below.

<http://edc.usgs.gov/products/elevation/swbdguide.doc>

Conclusion

This comparison of water data sources was provided by Scenery Solutions for the benefit of our customers.

While the SWBD data provides flight simulation scenery designers with another free option, the quality of the data still lacks far behind that of many commercial GIS data sources (such as the TeleAtlas data above).

Scenery Solutions will only use the highest quality, commercial grade data in all of our terrain scenery products for Flight Simulator applications.

Our newest source data also includes many hand-digitized data sets, created by GIS contractors, and funded by Scenery Solutions. The super high resolution data is created from satellite images with resolutions no worse than 15 meters and as good as 1 meter in some locations worldwide.