

Aggregation, Distribution and Mapping using Planisphere

Mihal Miu

Xiakoun Zhang

Junye Wang

Introduction

- GeoSpatial information is available from different suppliers: public, private, ngo
- GeoSpatial information is available in different formats, preferably open formats
- How can GeoSpatial information be consumed?
- How can GeoSpatial information be displayed/represented? Hopefully 3D/2D (visually)

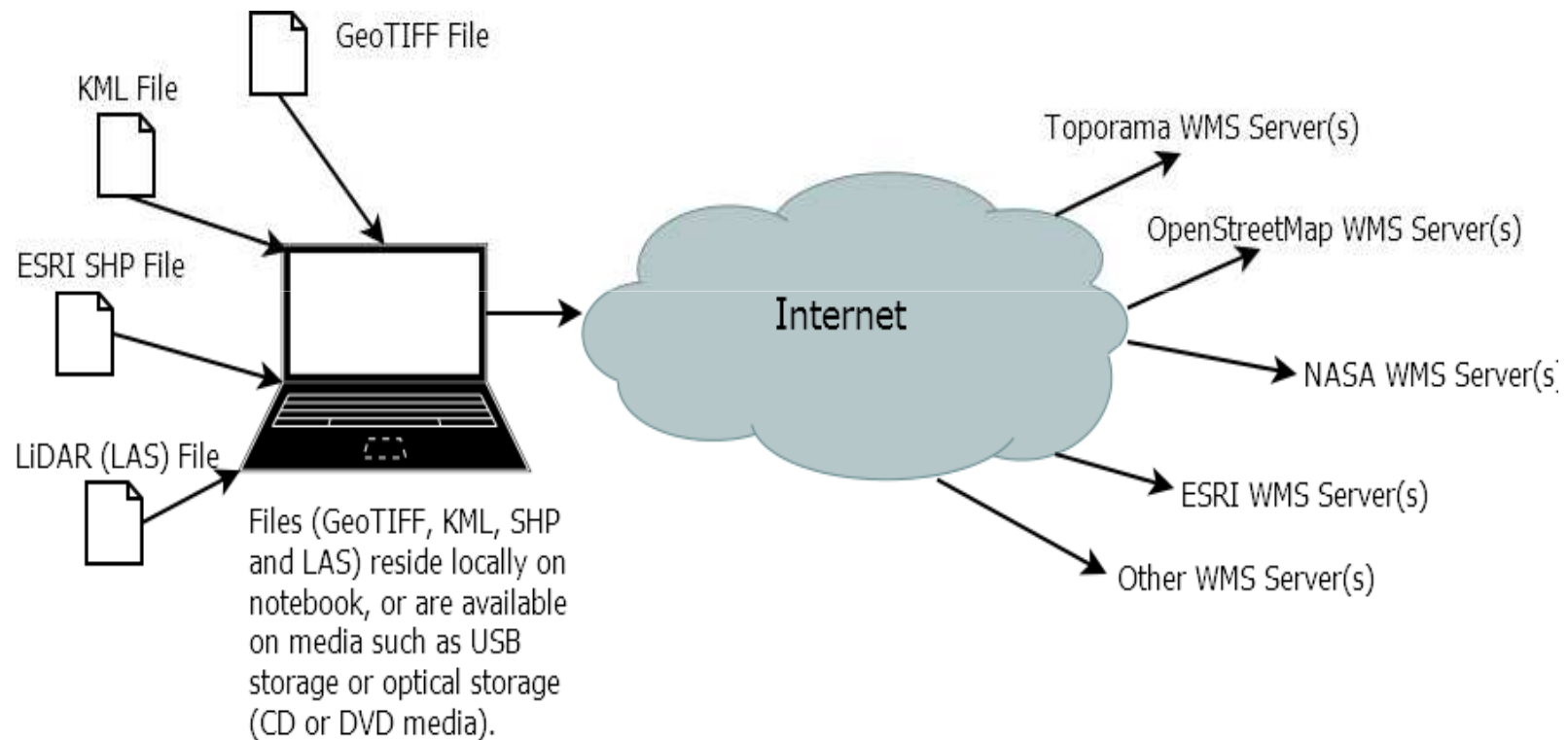
Problem / Opportunity

- Currently there is no GIS service that provides a complete coverage of the Earth.
- If multiple map services for geographically distinct regions could be aggregated then the end result would be a map with greater coverage.
- At the same time if multiple map services for the same geographical region could be aggregated then the resulting map produced would be a close to a complete map for that region.

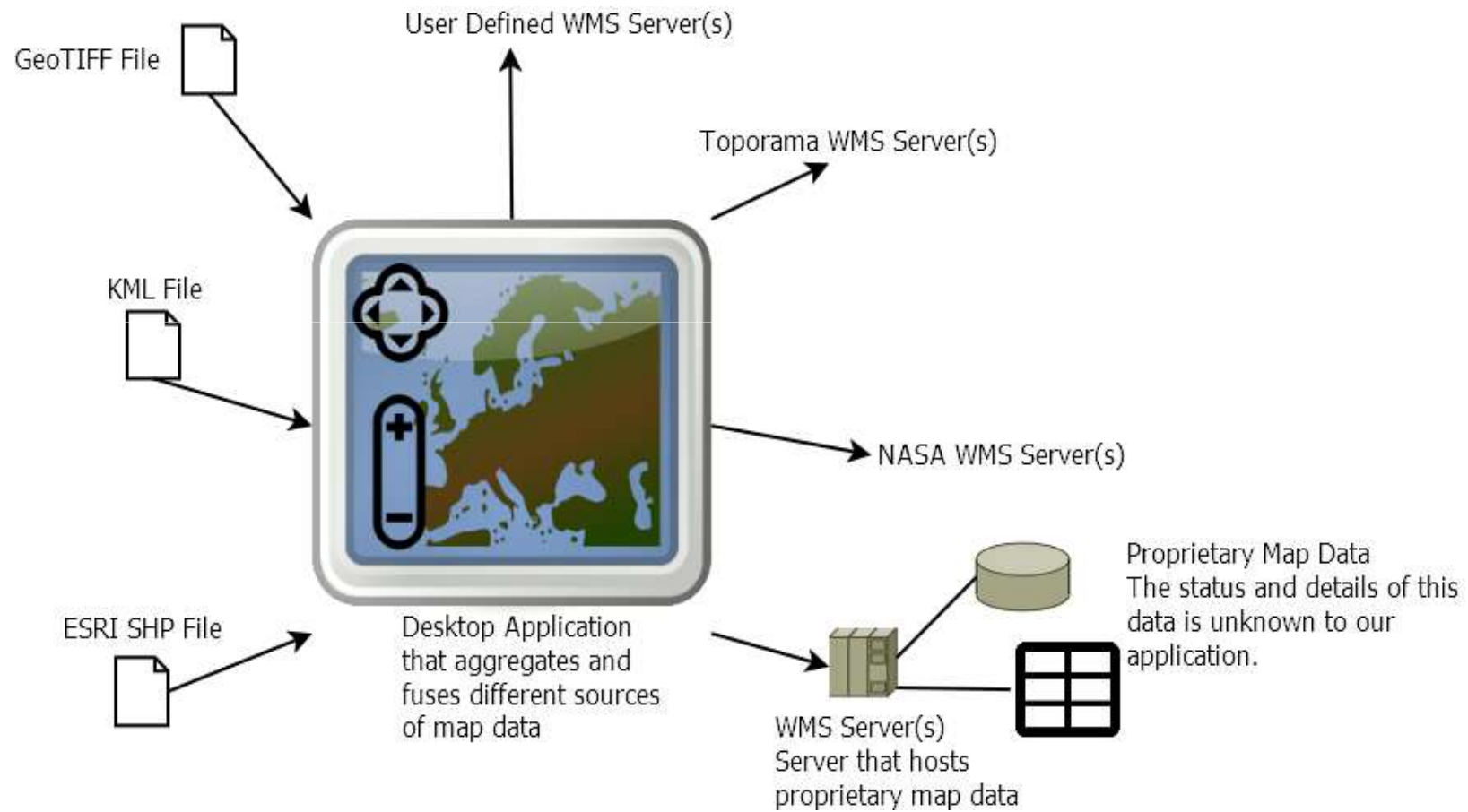
PlaniSphere

- <http://www.planisphere.biz>
- A platform independent 3D Virtual Globe
- Supports open format data for local and remote access (local access is supported by GeoTiff, KML and remote access is supported by WMS).
- Easy to use application with a minimal learning curve
- Powerful export capability – supported by GeoTiff
- May be enhanced by third party through plug-in infrastructure

Methodology (Abstract)



Implementation



PlaniSphere In Action

The screenshot displays the PlaniSphere application interface. On the left, the **Plugin Manager** window shows a table of installed plugins:

NAME	DESCRIPTION	STATUS
com...	A plugin for accessing JVM informat...	created
com...	A plugin for parsing NMEA strings.	created
com...	A plugin for displaying points of inte...	created
com...	A ZeroTrak asset monitor plugin.	created

Below the Plugin Manager is the **NMEA Parser** window, which displays the following information:

File: `ts/NMEA-files/20131105174638.txt`
Position: 43.662046616666665,-79.383425
Bearing: 3.0 km/h, 165.9 degrees
Date: 051113

The main **PlaniSphere** window features a top toolbar with icons for **Map** and **View**. Below this is a row of map server icons: **NASA Blue Marble Image**, **Blue Marble (WMS) 2004**, **i-cubed Landsat**, **Earth At Night**, **Atmosphere**, and **Stars**. To the right are buttons for **3rd Party Map Servers** and **Custom Map Sources**.

The **Layers** panel on the left lists the following layers with checkboxes and vertical sliders:

- Stars
- Atmosphere
- NASA Blue Marble Image
- Blue Marble May 2004
- i-cubed Landsat

A **JRE Sysinfo** window is overlaid on the interface, displaying system and JVM information:

Total Memory: 650641408
Max Memory: 7635730432
java.vm.name = OpenJDK 64-Bit Server VM
java.vm.vendor = Oracle Corporation
java.vm.version = 24.79-b02
os.name = Linux
os.arch = amd64
os.version = 3.19.0-20-generic

At the bottom of the JRE Sysinfo window is a **Memory Monitor** graph showing memory usage:

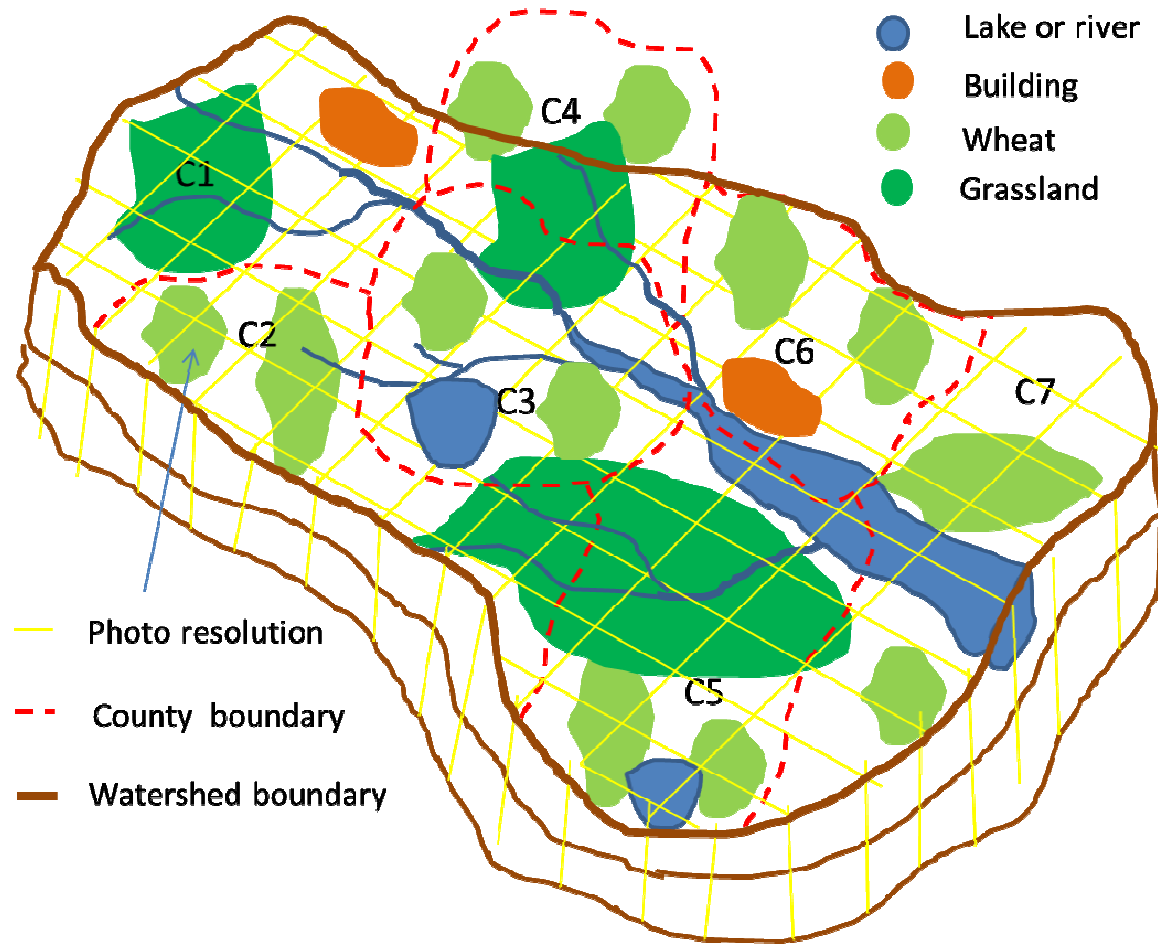
- 1437184K allocated
- 681832K used

The main map area displays a satellite view of a city street grid. A red location pin is placed on the map, with the word **Current** written in red text next to it. The map includes a small inset map in the top-left corner and a set of navigation controls in the bottom-left corner.

Athabasca River Basin



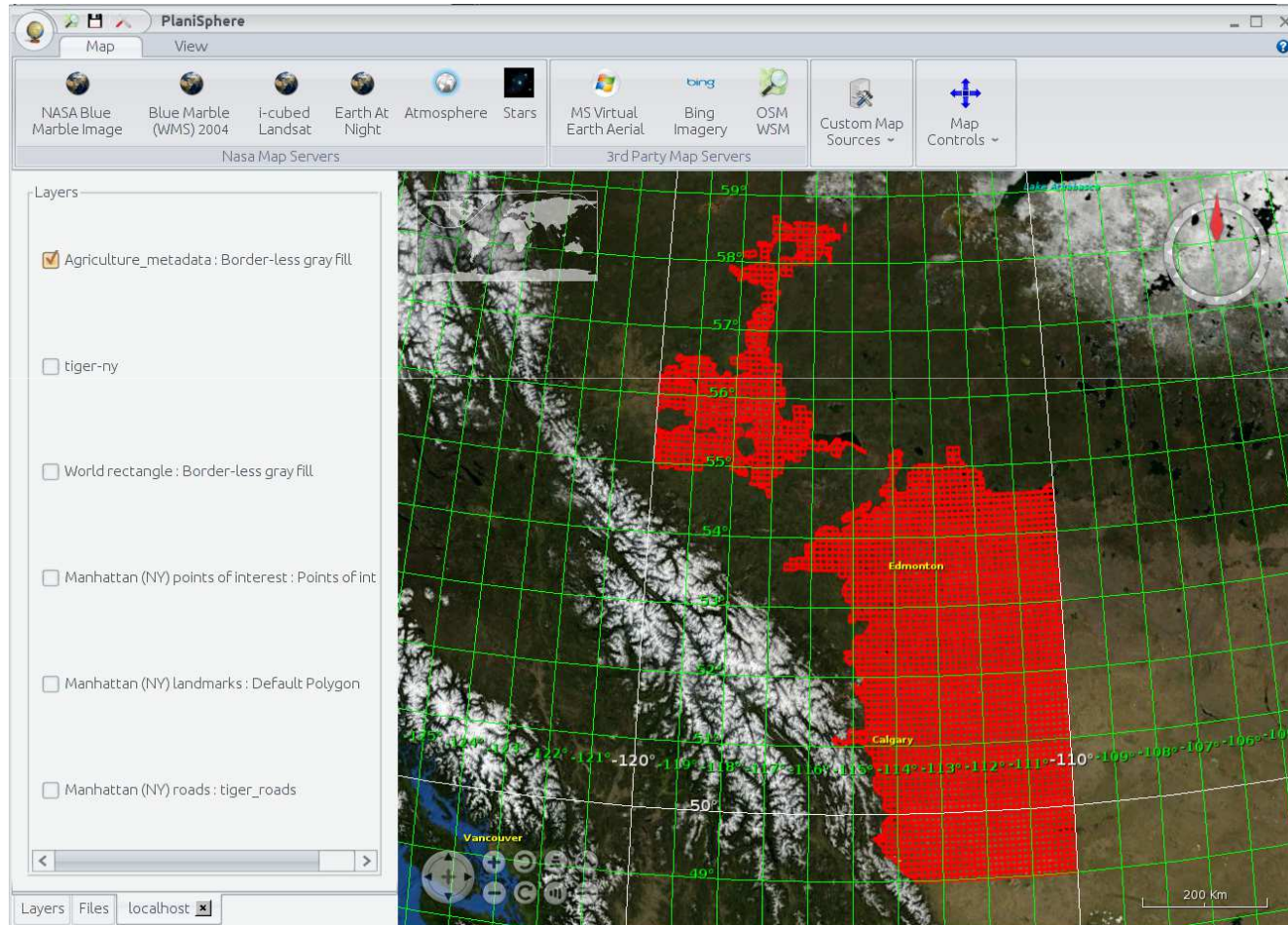
Watershed Details



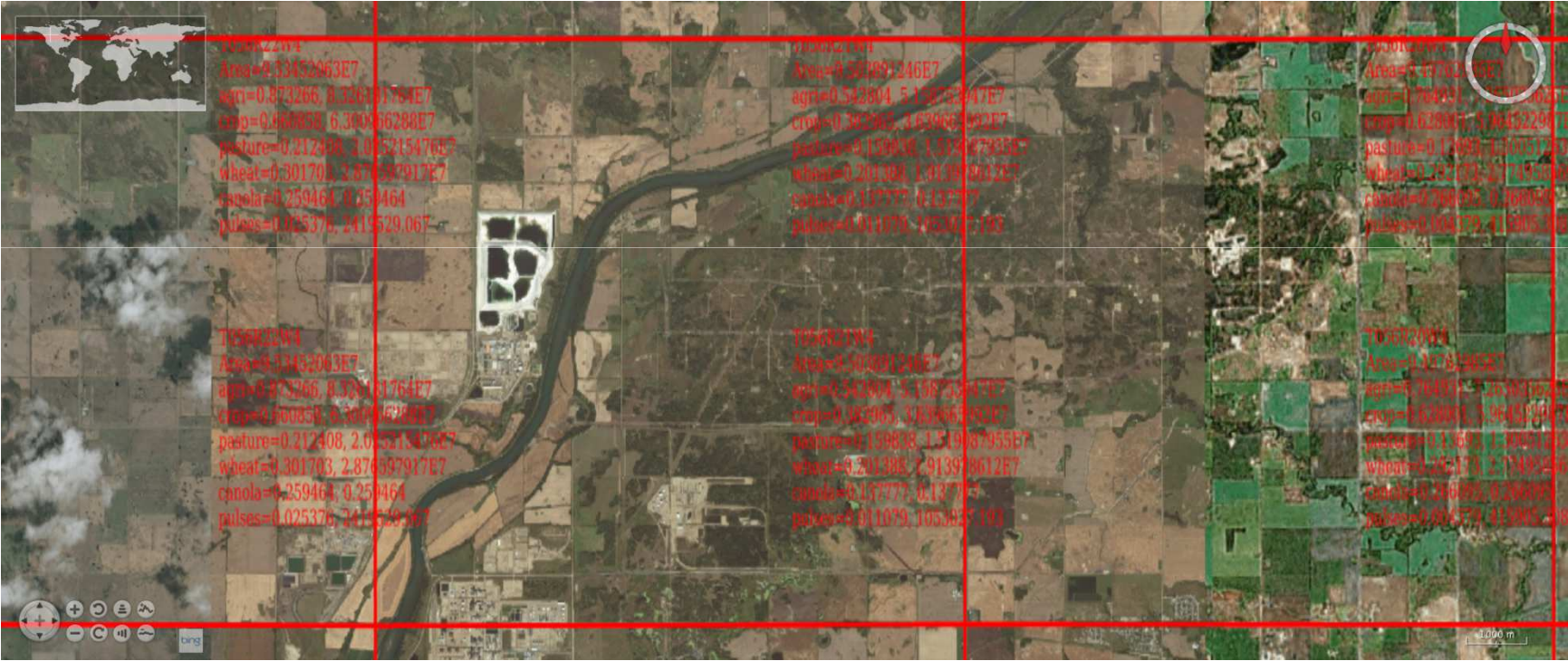
National Agricultural Census Data

T8	AG30T WP_T9	TOWN SHIP	AREA	dagri	agri	dcrop	crop	dpastu re	pastur e	dwhea t	wheat	dcanol a	canola
2	1	T111R1 9W5	76607 026	0.0055 69	42668 7.8	0.0007 89	60469. 79	0.0047 8	36621 8	0.0007 89	60469. 79	0	0
3	2	T111R1 8W5	31468 012	0	0	0	0	0	0	0	0	0	0
4	3	T111R1 9W5	94619 565	0.1793 17	16966 902	0.1019 66	96480 16	0.0773 5	73188 86	0.0724 02	68507 11	0.0280 86	26575 58
5	4	T111R1 6W5	40560 20	0	0	0	0	0	0	0	0	0	0
6	5	T111R1 5W5	59961 73	0	0	0	0	0	0	0	0	0	0
7	6	T110R1 8W5	91334 029	0.2616 69	23899 344	0.2227 52	20344 928	0.0389 16	35544 16	0.0889 25	81219 27	0.1209 68	11048 537
8	7	T110R1 6W5	13715 300	0.0015 72	21565. 92	0.0001 1	1511.0 42	0.0014 62	20054. 88	0.0001 1	1511.0 42	0	0
9	8	T110R1 5W5	94540 757	0.2767 81	26167 096	0.1769 39	16728 011	0.0998 41	94390 85	0.0508 8	48102 42	0.1250 78	11825 041

ARB Metadata



Aggregated and Fused GeoSpatial Data



Pros/Cons of Fused GeoSpatial Data

- Pros
 - New maps that may be used for further analysis
 - Analysis that was impossible or difficult can now be performed with ease and it may also be automated
- Cons
 - GeoSpatial data used may not always be suitable for analysis
 - Margin of error is dependent on the resolution of the GeoSpatial data
 - User intervention may be required when performing analysis

Conclusion

- Planisphere is an implementation of a 3D GIS that excels in the ability to aggregate and fuse geospatial information of various format types and different sources or providers.

Conclusion

- Planisphere has two strengths:
 1. Aggregation of geospatial data
 - Aggregation of geospatial data is achieved by consuming geospatial information of various format types (WMS, GeoTiff, ESRI shapefiles and KML). The location and provider of geospatial information is irrelevant.
 2. The ability to export the newly aggregated and/or fused geospatial data.
 - Exporting aggregated and/or fused geospatial data, is achieved by creating new files. Two possible formats are supported: GeoTiff and PNG.