Geoverse Software Review

Think about the last LiDAR dataset you worked with. Did you ever view all the data at once? Probably not. Much like large imagery datasets, LiDAR data are typically tiled, but unlike imagery we don't have well-established techniques for visualizing large collections of LiDAR data. Vendors have shown that they are very adept at collecting and processing large amounts of LiDAR data, but visualization has always been a weak point.

Viewing even moderately large LiDAR collections has its challenges, typically requiring high-end computer workstations with considerable amounts of CPU power and RAM, along with a fancy graphics card. To top it off it can take minutes to hours to load the data. The result is that viewing large LiDAR point cloud datasets is out of reach, not only to most of the geospatial community, but to the greater public as a whole. Geoverse is to my knowledge the first and only software package that attempts to tackle the issue of massive LiDAR point cloud visualization head on.

Geoverse is produced by Euclideon and sold in the United States by Merrick.

Euclideon traces its roots to the gaming industry where the company developed technologies that allowed for lower-end computers to search and display large amounts of 3D data. Geoverse was born out of the realization that this same technology could be of tremendous benefit to the geospatial industry.

Geoverse consists of two components: Convert and Massive Data Manager

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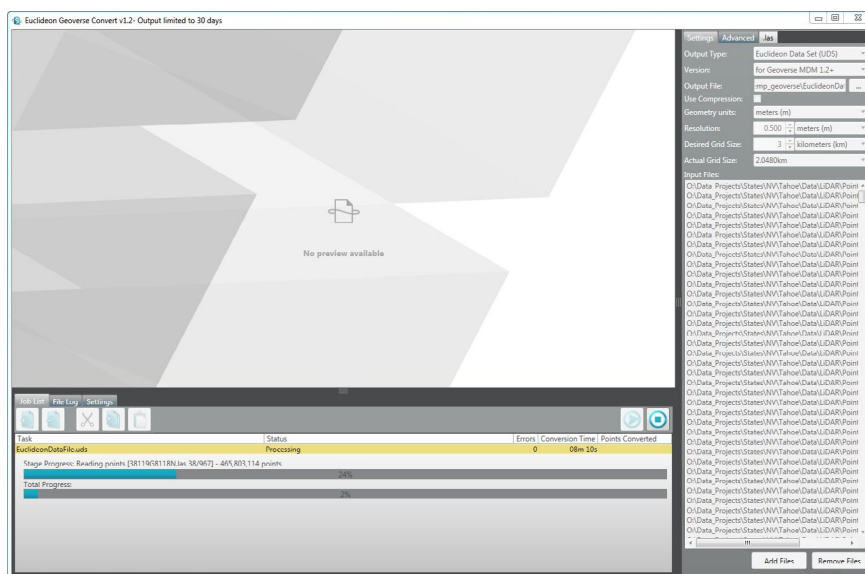

Figure 1: The Geoverse Convert module is used to process any number of LiDAR point cloud datasets into the UDS format for viewing in the Geoverse Massive Data Manager (MDM) package.

(MDM). These two components work in conjunction with each other, with Convert used to prep the data and MDM used to view the data.

The primary purpose of Convert is to transform the LiDAR data into Geoverse's proprietary UDS format. UDS compresses LiDAR data to 5-20% of its original size, without decimation. Data must be converted to the UDS format if you want to open it in MDM and take advantage of the Geoverse rendering technology.

Geoverse is not designed for viewing data in other formats, but Convert does support the most common LiDAR formats, including LAS, LAX, ASCII XYZ and e57. Convert is straightforward and easy to use. Within 15 minutes
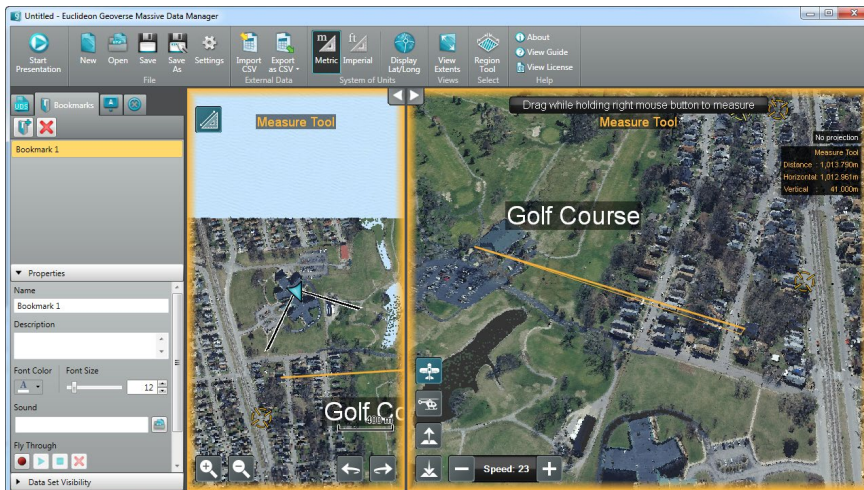
Figure 2: Geoverse MDM provides not only the ability to view huge LiDAR point clouds, but to also label areas and perform standard tasks such as measuring.

of starting up Convert, and no prior experience with the software, I had a 50+ billion point LiDAR dataset consisting of 967 LAS datasets totaling 323GB in size ready to run.

It took Convert a little over 3 hours to process all of that data into a single UDS file, of which the resulting file size was a bit over 10GB. If you do the math that is close to 3% compression—impressive! The user-specifications for Convert are clear cut. One essentially specifies the collection of files to be processed, some resolution settings, the coordinate system of the input data, and then Convert is ready to run.

The one drawback I uncovered was that Convert is only capable of color-izing the resulting UDS file using RGB or intensity values contained within the source point cloud dataset. Future versions are expected to include the ability to color the point cloud based on elevation, which would be most welcome from my perspective, as many airborne LiDAR datasets don't natively contain RGB values.

Once the data prep was finished with Convert I headed over to MDM to view the resulting UDS file. The UDS file opened instantaneously in MDM and it was simply amazing to be able to navigate through billions upon billions of LiDAR points on a file stored over the network. There was no lag time, no loss of detail, and although I was using

MDM on a powerful workstation the RAM and CPU resources used were minimal. To be able to load 50+ billion LiDAR point in a matter of seconds then browse through them seamlessly is something I had never experienced before. Needless to say I was impressed.

Once I was done being amazed by the Geoverse MDM rendering capabilities I turned to testing out MDM's tools. I found MDM, like Convert, to be easy to use, and I only had to periodically refer to the manual. Outside of its incredible rendering capabilities MDM has a few key tools that are worth noting. The first is the ability to overlay the UDS point cloud on Open Street Map and Bing Maps, the latter of which requires a license key. The ability to display a reference dataset such as Open Street Map is a real asset in terms of adding context to the point cloud data.

One can perform basic linear measurements using the measuring tool, compute areas using the region tool, and then export the area within region as a LAS file. The region export capability
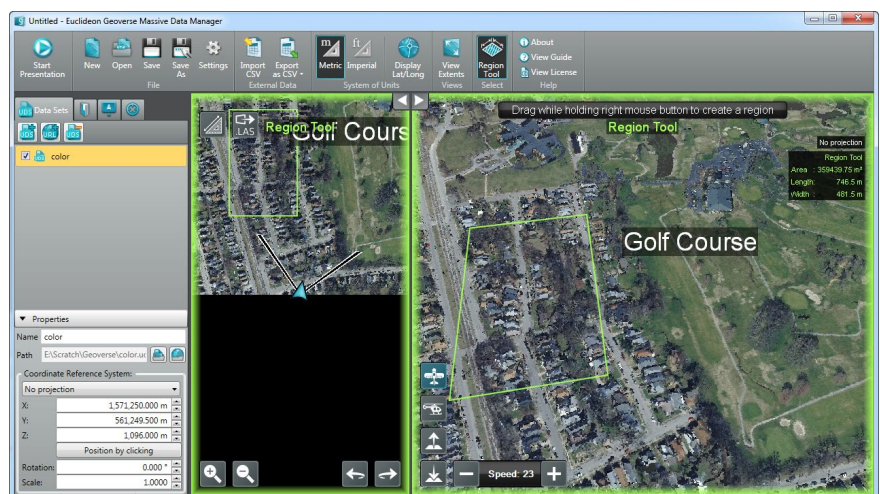
Figure 3:. Geoverse MDM's region tool allows the end user to make area measurements then export the area within the region to an LAS file.

allows MDM to function like a virtual data catalog in which users can browse an entire LiDAR dataset and select areas of interest—far more efficiently than selecting and merging individual LAS tiles. Using a combination of bookmarks and labels one can create compelling presentations that show off the LiDAR dataset. Labels and locations can be imported in CSV format, which is handy if you have this information stored in separate software package.

Geoverse is revolutionary in its ability to render massive LiDAR datasets. There is simply nothing like it in the market place at this time. I was impressed with its ease-of-use, performance, and stability. Geoverse excels at visualization, but it does have its limitations in that it cannot display anything beyond point clouds with RGB or intensity values.

While an RGB point cloud would definitely be the preferred format for the general public I could not help to think how useful Geoverse would be as a QA/QC tool if it could also render key LAS attributes such as number of returns and classification. Such a capability would allow an analyst to seamlessly investigate an entire LiDAR dataset and mark up areas with issues using the MDM location tool. Perhaps something for future versions?

If you are looking for a tool to visualize your LiDAR holdings and make them more accessible to a wider user base then Geoverse is a solid investment. ▪

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