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Finding Ft. Smith and Ft. Star in Smithland, KY

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Finding Ft. Smith and Ft. Star in Smithland Kentucky



Aerial photograph of Smithland, KY (*USGS 2018*)

By Austin Valentine Jr.

Light detection and Ranging or LiDAR, is an active form of remote sensing that is one of the most basic types of data collection at a researcher's disposal. Aside from geographic information sciences, the technique of LiDAR has been used extensively in a number of fields, including the field of archaeology and anthropology. What sets LiDAR apart from other forms of remote sensing is its ability to produce very accurate depictions of both the ground and the vegetative canopy (Guyot, Moy-Hubert and Lorho 2018).

Signals from either an aircraft or satellite are transmitted to the earth's surface, thousands of times in a given area of interest. This form of LiDAR is most commonly known as discrete-return, which produces a 3-dimensional (x, y, z) point. However, this signal is sometimes littered with various errors such as noise, false returns, and reflections from objects that are higher than the ground such as buildings and/or vegetation (Bolstad 2016).

These unwanted signals can then be filtered out keeping a more desirable form of the data, which can then be used to produce digital elevation models (DEM's). Through these digital elevation models, we can get a rudimentary 3-dimensional profile of the earth's surface (Bolstad 2016).

For my particular research, I am using dem's to find geographic remains of civil war forts across the state of Kentucky. For this paper I have focused my efforts on the fortifications that existed in Smithland, Kentucky near the confluence of the Ohio and Cumberland Rivers. The data that I have collected

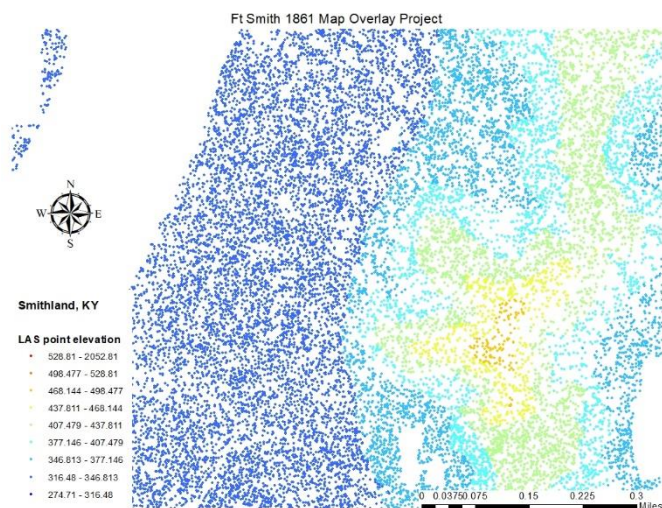


Figure 1.1 – Point Cloud Data (*KyGeoNet 2013*)

consist of 122,531,184 data points, out of which I have filtered out all, but 26,653,041 usable points, as seen in the point cloud in figure 1.1 (KyGeoNet 2013).

This point cloud data is then transformed into a digital elevation model by connecting the points to give us a 3-dimensional visualization as seen in figure 1.2. This model is then projected in NAD_1983_2011_StatePlane_Kentucky_North_FIPS_1601_Ft_US, using the Lambert Conformal Conic projection model (KyGeoNet 2013).

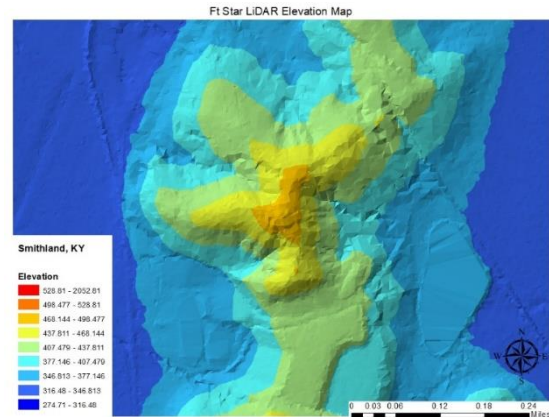


Figure 1.2 Digital Elevation Model (KyGeoNet 2013)

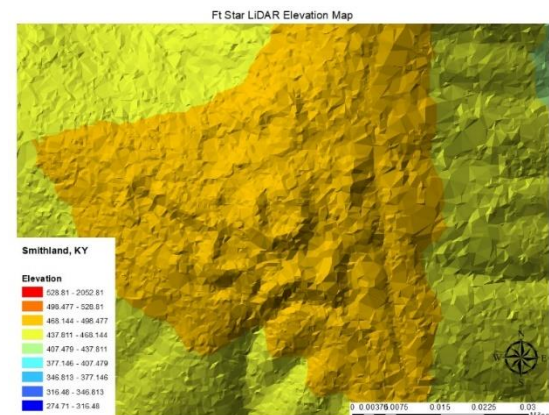


Figure 1.3 – Digital Elevation Model (KyGeoNet 2013)

If we were to zoom in on the model, as seen in figure 1.3, one can see what appears to be a star shaped feature atop of the hill, on the 3-dimensional model.

This anomaly seen in figure 1.3 was known in the 1860's as Fort Star. Now, if we compare its star-like shape to an 1861 drawing, as seen in

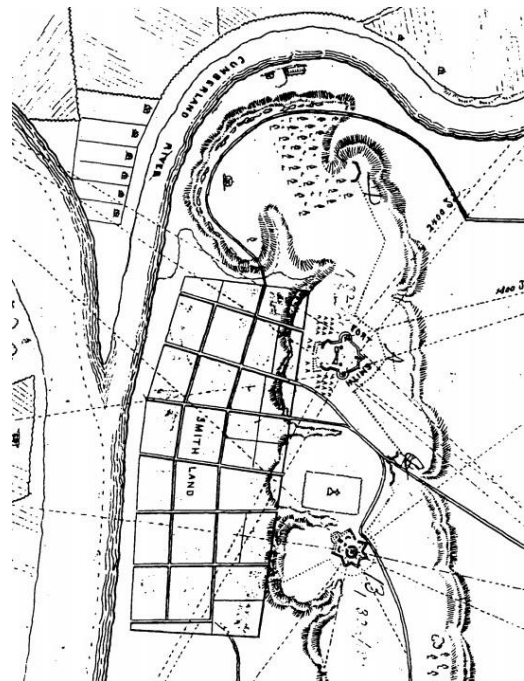
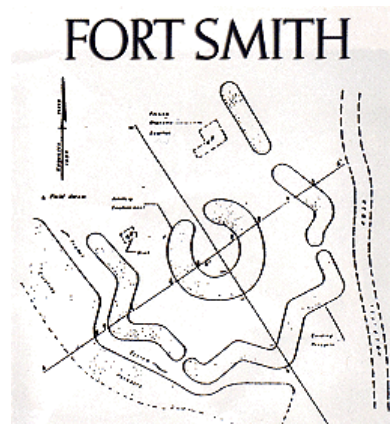


Figure 1.4a Drawing of Ft. Star (Trails-R-Us 2018) & Figure 1.4b December 13th, 1861 drawing by U.B. Scheller of Ft.'s Star and Smith (Morgan, David L. 1998)

figures 1.4a & b, we can see many unique similarities (Trails-R-Us 2018).

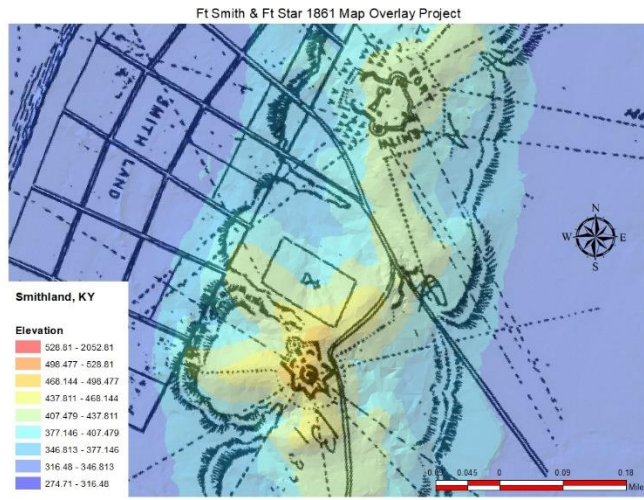


Figure 1.5 – Georeferenced 1861 Map of Smithland, KY
(KyGeoNet 2013) (Trails-R-Us 2018)

location of Ft. Star, but Ft. Smith as well.

Now that we have used LiDAR technology to locate both Forts, we can now see what remains of the original earthworks. As for Fort Star, the majority of the works are still intact. However, as for Fort Smith, if we zoom in as in figure 1.6 we can see where some of the original earthworks have disappeared. This was most likely the result of erosion due to land development and urbanization over the years.

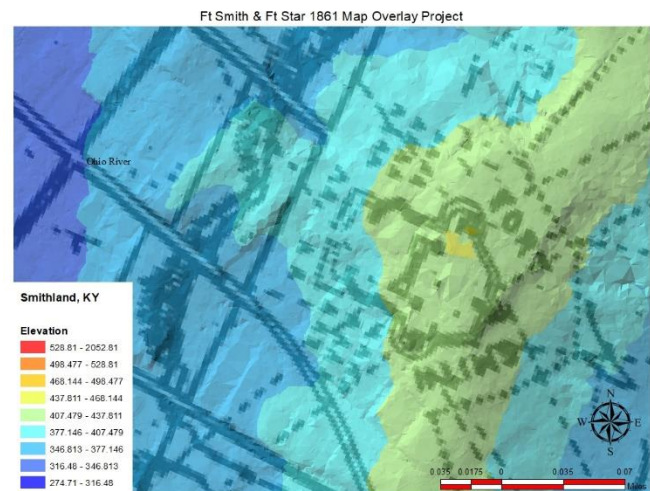


Figure 1.6 – Ft. Smith Digital Elevation Model Georeferenced Map
(KyGeoNet 2013) (Trails-R-Us 2018)

It just so happens that as of today the site that was Ft. Smith has been developed by contractors and there has been drastic changes made to the original site. Therefore, aside from archaeological evidence, the 1861 map may be the only known documentation that exists to

prove the sites former location.

This was a site that once commanded the high ground and had one of the best vantage point overlooking the Ohio and Cumberland Rivers.

Through the utilization of geo-referencing vintage maps upon LiDAR data we can now gain a 3-dimensional vision into the past. Through such procedures we can produce ways to conserve these sites for future generations

to view, understand, and gain an educated insight into human habitation and migration patterns. Such a combination can become a very useful tool to study and conserve the past while leading us into the future.

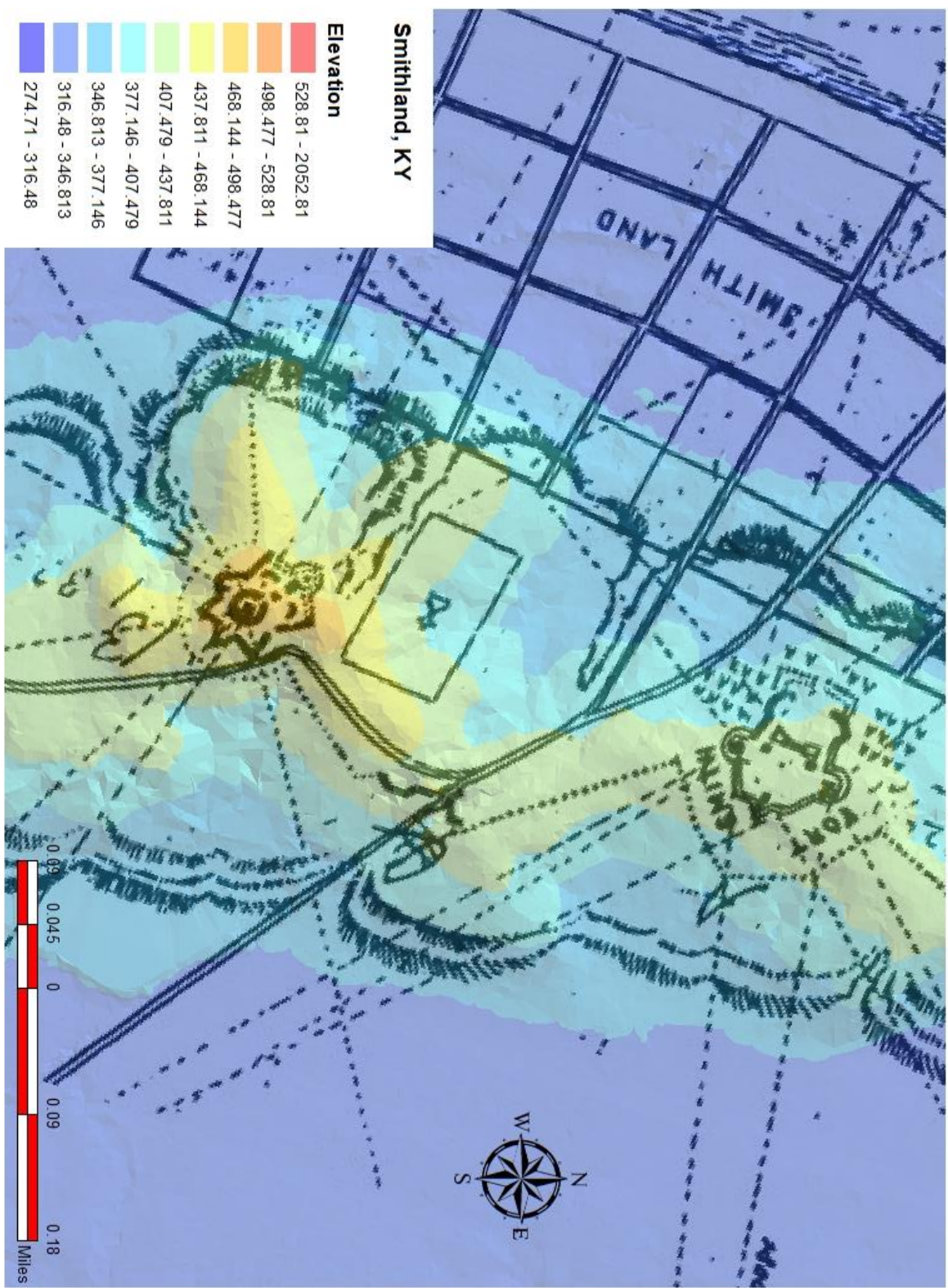


View of the Ohio River from atop of the Ft. Star Civil War Site



View of the Cumberland River from atop of the Ft. Star Civil War Sight

Ft Smith & Ft Star 1861 Map Overlay Project



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