2006 Digital Elevation Model Product Limitations and Appropriate Use

In 2005 the Arkansas State Land Information Board (ASLIB) requested the Arkansas Geographic Information Office (AGIO) prepare for an update of the digital orthoimagery of the state. Subsequently, the AGIO entered into a contract with EarthData International to conduct a 1m statewide ortho imagery acquisition utilizing a digital sensor (Leica ADS40) during the 2006 leaf off flying season. Due to the technology inherent in the ADS40 sensor a digital elevation model (DEM) was also obtained at the same time as the imagery, producing a 5m (5m post spacing xyz file) DEM. The new imagery and elevation data is planned for public release the first quarter of 2007.

The digital elevation model (DEM) being delivered as a part of the 2006 Arkansas Digital Ortho Program was generated for the purpose of <u>increasing the horizontal accuracy of the orthoimagery product</u>. The DEM being delivered shall meet the following specifications:

1: Vertical Accuracy shall meet or exceed 7.6 meters at a 95% confidence level
2: Horizontal Accuracy shall meet or exceed 6 meters at a 95% confidence level
3: Delivery Format shall be an ASCII point file containing xyz coordinates

Meeting this standard does ***not imply*** hydrologic integrity, and this data product is not suitable for detailed hydrologic analysis.   For evaluation purposes the table below provides a comparison of the 5m product and other elevation data that is presently available in the state.

Product	Vertical Accuracy	Horizontal Accuracy	Resolution / Post-Spacing	Source
30 meter DEM	7 meter RMSE	None published[*]	30 meter	USGS
10 meter DEM	7 meter RMSE[†]	None published[*]	10 meter	USGS
5 meter DEM	**3.88 meter RMSE[‡]**	**5 meter RMSE**	**5 meter**	**AGIO Arkansas Digital Ortho Program**
1 meter lidar collect	15cm RMSE	3.08 meter RMSE	1 meter	These results are general and would be determined based upon flying height and sensor used

Users may wish to conduct additional value added processing for other purposes. Derived products such as contour intervals can be generated in numerous ways. To this end the AGIO and EarthData International will refrain from speculating what contour intervals might be achieved with additional processing. DEM users should refer to the ASPRS publication *Digital Elevation Model Technologies and Applications* to learn more about the appropriate uses of this DEM product.

The ASLIB and AGIO are providing the updated elevation data product with x, y, & z values to users. However, users should be warned that value added processing to increase accuracies, or to generate derived products, will require the addition of ground control, a revised aero-triangulation, and stereo compiled 3-Dimensional break-lines. These needs should be reviewed on a case by case basis and will require cost estimates from the private sector.

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[*] The USGS does not publish a horizontal accuracy for their DEMs. This information can be tracked on a Quad by Quad basis through the USGS.

[†] Most 10m DEMs in the State of Arkansas are interpolated from the 30m DEMs, therefore their vertical accuracy is assumed to be equal to the accuracy of the original 30m DEMs.

[‡] These specifications exceed all <u>statewide</u> DEM specifications currently available.

Contact Information: Learon Dalby, GIS Program Manager, Arkansas Geographic Information Office
learon.dalby@arkansas.gov