

# Mapping Matters

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## Your Questions Answered

The layman's perspective on technical theory and practical applications of mapping and GIS

**Question:** 3D data captured by airborne lidar can be substantiated by texture and break line information by imagery data using a digital airborne camera. For the simultaneous data acquisition by airborne camera and lidar, should there be any relationship between the GSD of the airborne camera and the expected accuracy of airborne lidar data?

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**Dr. Abdullah:** The short answer to the question is, yes, there should be a relation between the imagery resolution (GSD) and the accuracy of the lidar data. Before any conclusion can be drawn on the subject, one should decide on the expected accuracy of the lidar. Different lidar users require different lidar data accuracy. Once the lidar data accuracy is defined, the correct imagery can be chosen for the task at hand. Typical digital camera products are classified according to their GSD, and therefore to their accuracies. The following table provides an established relationship between the image GSD and the expected vertical accuracies for products derived from such imagery. Such a relationship is widely accepted and used by the mapping community.

*"Once the lidar data accuracy is defined, the correct imagery can be chosen for the task at hand."*

Image GSD (m)	Vertical Accuracy RMSE (m)		
	Class I	Class II	Class III
0.075	0.10	0.20	0.30
0.15	0.20	0.40	0.60
0.30	0.50	1.0	1.5

*"Different users may have less stringent lidar accuracy requirements; in which case, imagery with either a coarser GSD or lower accuracy class can be used."*

Oftentimes, lidar data is produced to meet a vertical accuracy of 0.09 m; in which case, imagery with a ground resolution of 0.075 m processed to meet Class I accuracy is most desirable. The resulting break lines from such imagery should meet the lidar accuracy requirement of 0.09 m, and therefore, it can be used with the lidar data to create the surface model. Different users may have less stringent lidar accuracy requirements; in which case, imagery with either a coarser GSD or lower accuracy class can be used.

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