

AERIAL PHOTOGRAPHY ACCURACY

## Spatial Accuracy Measurements Now Available

by Beth Koch, Dakota County Office of GIS

Measurements of spatial accuracy are now available for our aerial imagery from 2002 – 2013 (except 2004).

### Background - What is it?

The spatial accuracy value is an estimation of how close locations in an aerial photo match/line up with the same locations on the ground. This is determined by comparing the coordinates of visible features on the aerials with the actual GPS coordinates of those same locations as collected in the field.

### Known issues

In an ideal test for accuracy, the points would be equally distributed across the county. The National Standard for Spatial Data Accuracy (NSSDA) also requires a minimum of 20 points for the accuracy test to be considered statistically reliable.<sup>1</sup> We used an existing set of points that had been previously collected by our County Surveyor's Office. The points weren't as evenly distributed as would be desired and as the imagery got older, the number of features/points present got fewer and fewer. Before 2002 (as well as for 2004) we cannot provide a statistically reliable accuracy measurement at this time because we don't have enough known points to test.

### Results:

Year	Leaf on/off	Resolution	Source	NSSDA	
2013	off	6 inch	AeroMetric	1.13	
2011	off	12 inch	Pictometry	5.28	
2011	off	6 inch	Pictometry	4.58	
2010	off	6 inch	MNDNR (Surdex)	1.32	
2009	off	12 inch	Aerials Express	4.05	
2008	off	6 inch	Pictometry	6.99	
2008	off	12 inch	Pictometry	7.36	
2008	on	1 meter	US Dept of Ag NAIP	13.59	
2006	on	0.6 meter	Aerials Express	4.77	
2006	off	1 meter	Pictometry	6.62	
2005	on	1 meter	Pictometry	8.37	
2004	on	1 foot	USGS	25.38	*
2003	on	1 meter	Farm Service Agency	8.96	
2002	on	0.75 meter	Aerials Express	16.40	
2000	off	0.6 meter	Met Council	8.13	*
1997	off	0.6 meter	Met Council	10.27	*
* not statistically reliable, too few points					

The NSSDA number can be thought of as the number of feet that the aerials are off from the real world. In a perfect situation, the value would be zero. The larger the number is, the lower the accuracy of the photography. What constitutes an acceptable value will vary from project to project based on the individual or organization's needs. The NSSDA values are

calculated at the 95% confidence level.<sup>2</sup> This means, for example, that 95% of the locations in the 2013 aerials from AeroMetric will be less than or equal to 1.13 feet from the actual ground locations.

### How does this affect you?


If you are simply viewing the aerials or working at a small scale, this probably won't

affect you. However, when working at a large scale or doing measurements, it would be good to be aware of the accuracy of the aerials you are using. Here are some examples of common GIS tasks that could be affected:

- Heads-up digitizing: Your newly created features will only be as accurate as the imagery they are traced or identified from.

- Comparing different years of imagery: You may see the aerials “shift” when flipping between years – the accuracy measurement could help explain why.

- Measuring from a feature in the aerials to a point, line or polygon in a shapefile or feature class: Using different aerials could provide different measurement results.

- Georeferencing other images or maps: Similar to heads-up digitizing, the newly rectified image can only be as spatially accurate as the aerial it is referenced to: 

Referenced document:

[Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy](#)

<sup>1</sup> Section 3.2.2

<sup>2</sup> Section 3.2.1