Date: April 10, 2017

TO: Mike Olsen, SaGES Host for 2017

FROM: Earl F. Burkholder, PS, PE, F.ASCE
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RE: Abstract for SaGES Presentation

Concepts of Spatial Data Accuracy Need Our Attention

The digital revolution has created disruptive innovation in many sectors of society. This presentation will focus on one of those sectors, the use of digital spatial data and especially spatial data accuracy. Surveyors have used geometry and spatial data for many years to compute control traverses and level loops for many applications. With the advent of computers and least squares adjustments, the traditional ratio of precision for judging the quality of a traverse has been replaced by positional tolerance and error ellipses. In the recent past, those concepts have entered the main stream of surveying practice and are even included in the 2016 version of the Minimum Standards for ALTA/NSPS Land Title Surveys.

The intent for those standards is commendable and the requirement in the standard is to base the Relative Positional Precision on "the error ellipse representing the uncertainty due to random errors in measurements in the location of the monument, or witness, marking any corner of the surveyed property relative to the monument, or witness, marking any other corner of the surveyed property at the 95 percent confidence level. Relative Positional Precision is estimated by the results of a properly weighted least squares adjustment of the survey." Regretfully, although the intuitive goal is well stated, even a properly weighted least squares adjustment will not provide a correct estimate of the desired uncertainty. The issue boils down to the difference between network accuracy and local accuracy.

The 2nd Edition of "The 3-D Global Spatial Data Model" is scheduled to be released in July – hopefully in time for the SaGES Conference. Chapter 14 in that book contains a comprehensive example of computing network accuracy and local accuracy. The proposed presentation will describe how the relative accuracy of any point with respect to any other point in the database can be computed with statistical reliability.

Background information is available at:

- http://www.globalcogo.com/ALTAandNSPS.pdf (scroll down to page 9)