

Way Forward for Surveying

Earl F. Burkholder, PS, PE, F.ASCE

Global COGO, Inc. – Las Cruces, NM

www.globalcogo.com & eburk@globalcogo.com

April 11, 2016

This is the third in a series of articles that I've prepared and submitted to the NCEES Basecamp web site. As a reminder, that web site was established for the collaborative use of those persons who attended the NCEES sponsored forum in January 2016 to look at "The Future of Surveying." I have attempted to keep NMPS Benchmark readers up-to-date by the articles submitted to and printed in the NMPS Benchmarks. See January 2016 issue for a generic article on [Disruptive Innovation](#). That article was written before I knew I would be attending the forum as a representative of AAGS.

A second article was printed in the March 2016 issue of Benchmarks [summarizing](#) my participation in the forum and offering my opinion that the Future of Surveying will be what we make it. The article that follows is the third article that I've posted to the NCEES Basecamp board. A fourth article has already been posted to the Forum web site and a fifth is nearing completion. Such articles are also posted on the Global COGO, Inc. web site at www.globalcogo.com/future.html. Plans are to offer each article for publication subsequent issues of Benchmarks. The third article on the "Way Forward" as posted on the NCEES Basecamp follows:

My participation in the NCEES Forum was as a representative of the American Association for Geodetic Surveying (AAGS). I've been careful to share my comments with the AAGS leadership before posting them, but my comments do not necessarily represent the attitudes and preferences of the AAGS. Specifically, promoting the global spatial data model (GSDM) is something I do. The GSDM has never been endorsed by the AAGS. I've gathered ideas and insight from many over the years but these views are largely personal and I alone must accept responsibility for any oversights and/or defects. I've read the pre-reads, listened carefully to the thoughtful discussions, and have learned much from my interactions with the NCEES group. Although my insight is not perfect and although I may have misunderstood points made by others, I'll be grateful and honored for professional leaders to consider:

1. The attention focused on the Future of Surveying by NCEES is appropriate and encouraging. I wholeheartedly support this continuing effort. Interaction, debate, and discussion are good.
2. Please continue listening to Michael Pallamary. Maybe we can't all be as outgoing and enthusiastic as he, but an important point he made early on was the importance of **taking additional classes and broadening our talent**. His support of the life and work of Curt Brown and the importance of boundary surveying is top-caliber. Early in my career I held a responsible position on a project involving surveys and recorded plats for several hundred parcels purchased by a utility company. My support of "land surveying" has been unequivocal ever since and I aspire for land surveying professionals to enjoy a fruitful career. But, as others have pointed out, land surveying is but one component of the broader field of spatial data applications. To be successful, most surveyors need to do more than just "boundary" and many do. Therefore, I argue in favor of surveyors becoming the default experts in collecting, handling, and evaluating 3-D digital spatial data – and that includes both understanding "measurement" and "evaluation of boundary evidence." I see promoting one to the exclusion of the other as being short-sighted.

3. I studied the article by Richard Vannozi that was circulated prior to the January 22nd Forum. He does a good job of describing challenges related to both “surveying” and “measurements.” In particular, everyone should read his conclusions.
4. Before learning that I would be attending the Forum, I wrote and submitted the article on Disruptive Innovation. That article is somewhat abstract but I believe it adds perspective to the “measurement” part of the challenge described by Vannozi. My article was not meant to exclude or detract from the importance of “land” surveying. Like the point made by Vannozi, I’d like to emphasize the opportunities for the surveying profession made possible by the digital revolution as opposed to “wringing my hands” over missed opportunities. It is not too late. We can do it!
5. I have no quarrel with the ground rules that were adopted for conducting the Forum. But when attempting to make a point that our discussion should include more than just land surveying, I was called down. I still don’t know what my infraction was but I remain convinced that an honest discussion of the Future of Surveying needs to include both components.
6. Immediately following the Forum Bill Hazelton posted a rather lengthy item in which he questioned the impact of “surface” efforts. I believe that marketing, branding, recruiting, and other missionary efforts can certainly be beneficial, but I feel that something more fundamental - the ability to understand and work efficiently with 3-D digital spatial data – can make more difference.
7. Dr. Hazelton suggested considering several other initiatives such as changing ourselves, not abusing those who call for change, and investigating internal versus external causes. Without detracting from the points he makes and the benefits associated with his suggestions, I’d like to focus on what we can do now to promote positive change.
8. Specifically, the 3-D global spatial data model (GSDM) has been defined as an appropriate model for handling spatial data – both traditional analog and 3-D digital. It involves study, education, testing, evaluation, and implementation. The benefits accruing to those who develop expertise in same can be enormous. I call to mind the example given by Dr. Hazelton of the young man who tested and compared terrestrial scanning and terrestrial photogrammetry – and then built his own UAV. That is an example of business and professional success in working with 3-D digital spatial data.
9. Where to start? For those who have read this far, I sincerely hope you will read and contemplate at least the following two items:
 - A. <http://www.globalcogo.com/setepaper.pdf>: This article was written specifically in support of the Surveying Engineering program at NMSU. Although somewhat abstract, the concepts can be extended readily to the profession at large.
 - B. <http://www.globalcogo.com/WestFed.pdf>: This item was prepared for the Western Federation of Professional Surveyors in 2011. It is not an “end-all” but a good place to start.
10. For more information, the following are all available at : www.globalcogo.com/refbyefb.html
 - A. <http://www.globalcogo.com/gsdmdefn.pdf>: Defining document
 - B. <http://www.globalcogo.com/BasicAssumptions.pdf>: Logical foundation for the GSDM
 - C. <http://www.globalcogo.com/psgsdm.pdf>: Three articles written for Professional Surveyor
 - D. <http://www.globalcogo.com/gsdm-eos.pdf>: Written for the scientific community
 - E. <http://www.globalcogo.com/curdesgn.pdf>: Curriculum issues presented to fellow educators
 - F. <http://www.globalcogo.com/figpaper.pdf>: Presented at international FIG meeting in 2002

- G. <http://www.globalcogo.com/3DGPS.pdf>: Obviates the need for a low distortion projection
 - H. <http://www.globalcogo.com/Digital%20RevR.pdf>: International view of Digital Revolution
 - I. <http://www.globalcogo.com/elevgsdm.pdf>: Institute of Navigation paper on elevations
 - J. <http://www.globalcogo.com/accuracy.pdf>: Spatial data accuracy is solved in 3-D
 - K. <http://www.globalcogo.com/challenge.pdf>: Challenge for spatial data users worldwide
11. These 3-D concepts are discussed in a book, “The 3-D Global Spatial Data Model,” published in 2008 and available from [CRC Press](#). A 2nd Edition of the book is being prepared by Earl F. Burkholder.
12. Proposal – NCEES should sponsor a separate 2-day workshop devoted to 3-D spatial data issues:
- A. Attendees charged to cover the costs.
 - B. Participation limited to 25-30 persons (Forum organizations)
 - C. Subsequent workshops (2 or more) held exclusively for state licensing boards
 - D. NCEES could license presentation of the workshop to other (surveying/engineering) organizations