Date: May 9, 2019

TO: Ivan DeLoatch, Executive Director – FGDC
Scott Freundschuh, Chair – COGO Report Card Steering Committee
Juliana Blackwell, Director – National Geodetic Survey

FROM: Earl F. Burkholder, PS, PE, F.ASCE eburk@globalcogo.com
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RE: Looking ahead after listening to the Geospatial Summit –
Is there a role for the 3-D global spatial data model (GSDM)?

This memo is concise, but the issue is huge. To what extent should we (society) and you (government) be paying attention to benefits derived from implementation of an integrated model for 3-D digital spatial data?

When then President Clinton signed Executive Order 12906 in 1996, I had recently left my employment as a full professor of surveying at Oregon's Institute of Technology. My goal in 1994 was to capture benefits of the third dimension made possible by GPS and other modern technologies. It has been an exciting pursuit.

Details can be gleaned from my resume but it may help to know that, beginning in high school, geometry, logic, surveying, GPS, computers, and life-long learning have captivated my interest – let's say they are my "hobby."

I had more than a passing interest in the first COGO Report Card and shared comments on same in various places. It was a good document, but it does not look ahead (as I think it should) to taking advantage of the characteristics of 3-D digital spatial (and geospatial) data. I had an opportunity to assist in preparing the second COGO Report Card but, after discussing various issues with Dr. Freundschuh, I was not part of any of the expert teams. Dr. Freundschuh pointed out that the primary function of the Report Card was to document existing conditions as opposed to establishing a vision for the future. I respect that, but. . .

My aspiration is that a vision for future use of 3-D digital spatial data will be supported by the COGO Report Cards. A future Report Card will document on-going improvements to the NSDI. Supporting items include:

- The 3-D model and procedures are already published and readily available in a textbook. Find the book with a web search on "3-D global spatial data model." Although less well organized, the information is also available at www.globalcogo.com. The equations are all public domain and well within the intellectual and conceptual capacity of most practicing professionals. "Black box" procedures are avoided.

- The GSDM includes both geometry (functional model) and spatial data uncertainty (stochastic model) in the Earth-centered Earth-fixed (ECEF) system used by scientists worldwide. The technical rigor of the GSDM has been successfully defended, www.globalcogo.com/validation.pdf.

- Looking ahead to 2022 datums, the use of an integrated 3-D model should eventually replace the 2-D map projection model for state plane coordinates. One reason I say this is my previous experience with "elevated reference systems" – www.globalcogo.com/EFB-Thesis-1980.pdf. The GSDM offers the surveying community a distortion-free solution while simultaneously providing the GIS community with a single system for a whole state - www.globalcogo.com/NewDatum2022.pdf.

- The U.S. Military has embarked on an ambitious effort to make more efficient use of geospatial data as evidenced by awarding a rather large contract for geospatial support, www.govconwire.com/2018/02/army-taps-general-dynamics-leidos-for-200m-geospatial-support-contract/. Should they also consider the GSDM?

- The NGS Strategic Plan: 2019-2023 contains information about conforming to the United Nations stipulation that all counties adopt a common global geodetic reference frame (GGRF). I see the GSDM as being compatible with that as well. http://ggim.un.org/knowledgebase/KnowledgebaseCategory37.aspx