Comments on FGDC Strategic Plan for NSDI 2025=2035

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Active web links are included at end of comments. August 6, 2024

#	Page	Line	Section	Type	Proposed Change/Comments
1	4	65	Foreword	T	The Foreword is comprehensive and well written. Line 65 mentions positional accuracy. FGDC-STD-007.1-1998 defines network and local accuracies on page I-9 but, in particular, details for computing local accuracy are ambigous. Precise mathematical equations for computing local accuracy are included in a 1999 paper by Burkholder, see www.globalcogo.com/accuracy.pdf, which references the FGDC standards in the conclusion. Local accuracy has been hotly debated since then. The precise definition survives, see www.globalcogo.com/validation.pdf. Rigorous computation of local accuracy between monuments 120 and 400 as presented in 2017 is a clincher, see www.globalcogo.com/EFB-SaGES-ALTA-NSPS.pdf. What are the chances that adopting a concise mathematical definition for local accuracy might become part of the NDSI Strategic Plan for 2025 to 2035? See next item.
2	5	94-98	Foreword	G	A reevaluation of current approaches to using spatial data in light of emerging technologies should include an evaluation of abstraction/techology/policy/ practice as described in Part I - see www.globalcogo.com/Part-I.pdf.
3	5	100-113	Foreword	G	These sections make the case for woking collaborative and integrating spatial data with other disciplines (all over the world). Other sections on page 5 are also 'good.'
4	7	all	Graphic	G	The graphical summary of the Vision for 2035 is quite good. The statement about seamlessly connecting with a national geospatial ecosystem bodes well. Using a 3-D model for 3-D spatial data as described in Part I above supports Vision 2035!
5	8	141-179	Executive Summary	G	The Executive Summary does an excellent job of describing various concepts and weaving them together into a coherent persuasive argument for adoption.
6	9	180-191	Introduction	G	USGS is to be commended for developing the Geospatial Data Act of 2018 as passed by Congress. From my perspective, that gives the FGDC control of the narrative and future activities. This Strategic Plan shows FGDC is taking that responsibility seriously. Where might I find more information on non-federal stakeholders?

#	Page	Line	Section	Type	Proposed Changes/Comments
7	9	200	Introduction	G	Mention ASCE's Future World

As a Life Member of ASCE I make nominal contributions to the ASCE Foundation and support the ASCE "Future World Vision - Infrastructure Imagined." Should it be included?

#	Page	Line	Section	Type
8	9	210-222	Introduction	G

"Build once, use often" is prudent. Other points about data being timely, current, and dependable are well taken. Additionally the ability of the global spatial data model (GSDM) to reliably track 3-D spatial data accuracy should be included. As an example, see http://www.globalcogo.com/EFB-SaGES-ALTA-NSPS.pdf.

#	Page	Line	Section	Type
9	10	223-231	Introduction	G

My aspiration to include the agencies/stakeholders in a Part I discussion of the convergence of abstraction/technology/policy/practice pales in comparrison to the effort it must take to orchastrate the concurrence of the dependencies listed.

#	Page	Line	Section	Type	Proposed Changes/Comments
10	10	232-242	Introduction	G	Include JSE perspective.

The ASCE Journal of Surveying Engineering (JSE) has a new Editor who is bringing a fresh perspective and renewed enthusiasm to the journal. One of his first projects was to create an editorial written by previous Editors to describe the first 150 years years of the JSE. I was honored to contribute material covering the 8 years I served as Editor. My comments predate the NSDI but describe the manner in which engineering practice should realize benefits of using the NSDI. As I understand it, that Editorial has been formally approved and will appear in a future JSE issue.

#	Page	Line	Section	Type
11	10	241-242	Introduction	G

What can I do to help promote use of the NSDI? It is no secret that my professional focus is, and has been for years, service to spatial data end users (surveying/ engineering/GIS etc.). I've enjoyed various engagements and the profession has very good to me. Taking inspiration from Ralph M. Berry, Ed Mikahil, Alfred Leick, Kurt Bauer, and untold numbers of colleagues and students and building on my initerest in geometry, history, computers, and GNSS, I was able to describe the concepts needed/used to define the 3-D global spatial data model (GSDM). That and activites described at www.tru3d.xyz represent my current efforts (my hobby).

#	Page	Line	Section	Type
12	10	245-250	Vision/Mission	G

Seemlessly interconnecting spatial data with disparate origins is an oxymoron. More efficient data intergration can be achieved by using a 3-D model for 3-D data.

#	Page	Line	Section	Type	Proposed Changes/Comments
13	10 - 11	252-279	Core Values	G	This is the opposite of "I don't like it." The list of "core values" is well-written and describes underlying principles quite well. Kudos!!
14	11	262	Core Values	E	". . . data are fit. . ." I was taught "old school" editing. Never split an infinitive and 'data' are plural.
15	11	281-310	Goals & Objectives	G	Promoting open standards (and other practices) to enhance collaboration needs to be emphasized. My aspiration is to see NIST (or someone) identify a global standard for the entire spatial data user community. That aspiration is identified in the first paragraph of page 3, www.globalcogo.com/gsdmdefn.pdf (1997) and can be realized with the assistance of NIST, www.globalcogo.com/NIST.pdf.
16	12	312-343	Goal 2	G	This entire section identifies important/impressive accomplishments of the NSDI.
17	12	319-325	2.1 Data	T	A universal 3-D spatial data model provides the foundation for the global spatial data infrastructue including the Federal geospatial data porfolio.
18	12	327	Innovation	E	". . .data are safe. . ."
19	13	329-332	Objective 2.2	G	The integrity of spatial data is essential. That applies equally to the coordinate systems and to the accuracy of the data. Every user needs the confidence to know, "with respect to what?" The integrity of AI for facial recognition was challenged and is much improved, see www.globalcogo.com/3D-and-AI.pdf. In the same way that algorithmic justice is critical in facial recognition, algorithmic integrity is critical for spatial data applications being supported by AI, (true 3-D versus pseudo 3-D).
20	13	333-343	2.3 and 2.4	G	These two objectives on standards and infrastructure are both "spot on" and supported by adoption of an integrated 3-D model for 3-D data as outlined in Part I, see www.globalcogo.com/Part-I.pdf. **The system is already in place**.
21	13 & 14	345-385	Goal 3	G	Having spent 25 years teaching upper division surveying classes in public higher education, being involved in ABET accreditation, and presenting seminars to many professionals, I have a feel for the diversity of talent needed and the dedication of many spatial data technicians and professionals. Goal 3 is good.

#	Page	Line	Section	Type	Proposed Changes/Comments
22	14	377-378	Goal 3	E	Add geometry and CAD to list

I would suggest that data visualization, geometry, and CADD be added to the list.

23 14 387-392 Outlook & Trends G

Continuous revision and realignment of objectives come under the banner of disruptive innovaton. I see your control of the narrative as a huge tool for managing disruptive innovation. Affecting change from my perspective is more of a challenge.

24 14 394-398 Big Data & Analytics G

Is it possible that efforts to corral "Big Data" have suffered for want of a common accepted standard spatial data model? - see www.globalcogo.com/BIGDATA.pdf.

25 14 399-402 Advancements . . . E ". . .data are collected. . . "

Miniaturizing sensors and applying Moore Law to computer capability are driving forces in the digital revolution. The NSDI strategic plan provides an opportunity for the spatial data community to modernize the underlying spatial data model. An important feature is that Euclid's rules of solid geometry have an infinite shelf life.

26 15 403-425 Advancements etc. G

These sections are well writen and make important points. Points that could be emphasized include intergration with AI and the element of trust. Little benefit will be accrued if the user community finds reason not to trust "the system."

27 15 427-437 Interoperability etc. G

Prior to 1959, the USA, Canada, and England used different cm/inch conversions. The United States used 2.540005 cm/inch, Canada used 2.540000 cm/in (exact), and England used 2.539997 cm/in. Following WW II, NATO countries collaborated on building military equipment only to discover that machining tolerances for engine components built from the same blueprints were responsible for engines that would not run. Although the differences were small, the benefits of using a common standard conversion justified adoption of the International Foot by the 1959 Conference on Weights and Measures (2.54 cm/in). As indicated in this section, the benefits of interoperabilty and standards afforded by an integrated 3-D global spatial data model that includes both functional/stocastic components are viewed as comparable. The following section on "Use Cases" supports that view.

28 16 - 18 439-529 Use Cases G

The impact described in this section is very impressive. In support of all points made, please note that the global spatial data model (GSDM) supports them all - in particular. digital twins and high-definition maps.

#	Page	Line	Section	Type	Comments
29	18	530 - 546	Next Steps	G & T	The 'next step' points made in the Strategic Plan demonstrate careful thinking and a command of the 'big picture.' That comprehension/writing is totally commendable. But, good as those steps are, the efforts of all participants will be frustrated by any lack of buy-in to use of a standard universal global rigorous model for 3-D spatial data. Consider the benefits realized AFTER the International Foot definition was adopted. A huge 'next step' in my opinion will be an authorative study by NIST (or other credible source to develop justification for universal adoption of a standard 3-D model. Isn't it true that military engagements around the world routinely exploit characteristics of 3-D digital spatial data? The rules of solid geometry and the equations of motion are well known. There are no secrets in the GSDM and all equaitons used therein are in the public domain. The challenge is getting participants to work together for the good of all. Come to think of it, there must be a reason the "perspective paper" was awarded First Prize at the NMSU Technology Conference in 2004, www.globalcogo.com/setepaper.pdf. http://www.globalcogo.com/accuracy.pdf http://www.globalcogo.com/validation.pdf http://www.globalcogo.com/EFB-SaGES-ALTA-NSPS.pdf http://www.globalcogo.com/Part-I.pdf http://www.tru3d.xyz http://www.globalcogo.com/gsdmdefn.pdf http://www.globalcogo.com/NIST-memo.pdf http://www.globalcogo.com/3D-and-AI.pdf http://www.globalcogo.com/BIGDATA.pdf http://www.globalcogo.com/setepaper.pdf

Other sources worthy of careful attention include:

1. "The Structure of Scientic Revolutions - 3rd Ed," by Thomas S. Kuhn 1962,1970, 1996
2. "Innovators: How a Group of Hackers, Geniuses,& Geeks Created the Digital Revolution," by Walter Isaacson, 2014. He emphasizes the role of federal funding.

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