

Now it's Personal

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I learned recently that Javad Ashjaee, a talented GPS pioneer died on May 30, 2020, in Moscow, Russia, losing a three-week battle with COVID-19. He championed integration of GPS and GLONASS positioning technologies and is listed as the primary inventor on more than 100 patents. I admire his contributions, in part, because he was willing to challenge the status quo and because he followed word with action. I am proud to add his name to my list of “professional heroes.”

Unlike many, my wife and I have been somewhat insulated from the impact of the COVID-19 pandemic. Being retired, our income is “fixed” (meaning it is steady). On the flip side, our expenses have gone down, for example, because the gym I frequent was temporarily closed and because we canceled trips to visit grandkids/families. But missing birthday parties is mitigated by using social media creatively – Zoom to the rescue. Yes, when the “new normal” arrives, we hope to resume road trips as appropriate.

Not being totally devoid of a social conscience, the COVID-19 issue leads to a disquieting question – to what extent should I apologize or feel guilty for our “privileged” circumstances? The obvious answer is, “not at all.” I’ve been diligent my whole life and we’ve been frugal with our resources. Now is the time for us to relax and enjoy life – and we do. On the other hand, we are members of a broader community and we gain satisfaction from being able to contribute to the well-being of others.

It would be self-serving to “beat my chest” by listing things I do for others – not going to happen. But, following the example of Dr. Ashjaee, I feel justified in highlighting professional, social, and political issues deserving our collective attention. As an aside, I recently read “Bully Pulpit” by Doris Kearns Goodwin about Theodore Roosevelt and William H. Taft leading the U.S. through challenging times in the early 20th century. She describes many fascinating parallels with the political, economic, and social challenges being faced today. I would like to believe that (collectively) we can learn and benefit from history as current challenges are being addressed.

A talented writer could weave the following musings into a compelling narrative but, in this case, you get what you get. Some of the following may be recognized as being repetitive. Bear with me. . .

- When I see something that should be changed, I attempt to envision and promote a solution instead of complaining about the way things are. Being part of a solution is preferred to being a part of the problem. Of course, perceptions differ. How does one find the right balance between “going along to getting along” and “take it or leave it”?
- I am more comfortable with science and logic than with philosophy and emotions. In my lifetime I’ve seen the “reality” pendulum swing back and forth. Achieving a balance is a challenge.
- Good leaders have a way of bringing out the best in people. My intent is to develop and share the evidence. Just as I resist being told what to believe, I am convinced that each of us should use our critical thinking skills to evaluate the evidence in forming a defensible conclusion - i.e., to own it. A former college president once suggested that “asking the right question is better than knowing the answer.”

- Manipulation of the media is not a new phenomenon. Architects of public opinion in the era of the Bully Pulpit were just as talented as journalists are today but they lacked the efficiency of current digital tools. Is “snake oil” today different than it was 100 years ago? My response is, “critical thinking to the rescue.”
- Sometimes as a parent I relied on the concept “the end justifies the means.” And, when kids asked “why” it was easy to reply, “because I said so.” Does that apply to raising public awareness of social injustice? Can property destruction be justified? Is “listening” part of our conversations?
- It seems that we can justify almost anything by “demonizing the opposition.” I cringe when I hear American citizens referred to infidels. Understandably, in 2001 it took little effort for me to demonize perpetrators of the 9/11 assault. If that makes a hypocrite of me, so be it. On the other hand, given the current political environment, I find it hard to believe that anyone in the opposing party is the “devil personified” as commonly portrayed in the media. As a throw-back to the Bully Pulpit era, do an internet search on “muckrakers” and form your own opinion about tactics of the press and their role in fighting corruption – both then and now.
- Consequences are another measure by which actions – or inactions – are judged. My professional career was born in Flint, Michigan. My wife is a Michigander. We still have family and friends in Michigan – including Flint. Undoubtedly, you’ve heard about the “lead in the water” crisis that began in 2014. The well-being of the children of Flint was ignored (even denied) by professionals at several levels. Can you imagine more devastating consequences of the deeds and misdeeds at local, state, and national levels? To learn more about a compassionate response read, “What the Eye Does Not See” by Mona Hana-Attisha. The ultimate impact will probably never be known.
- Recent heavy rains caused the failure of two dams in central Michigan. No lives were lost but property damages are huge. Does the difference in consequences affect the accountability of owners, regulatory agencies, and technical professionals? Various lawsuits have yet to be settled but I believe that characteristics of the public service culture in Michigan need serious attention.
- Basis-of-Bearing and the New Mexico Board of Licensure for Professional Engineers and Professional Surveyors (BOLPEPS) is also personal. Given that BOLPEPS efforts are focused on safeguarding “life, health, and property and to promote the public welfare,” I am a staunch supporter of the BOLPEPS. Board members are highly regarded professionals and I harbor no animosity toward board members or staff. However, I have been a “burr under their saddle” by insisting that an irrelevant concept in the Minimum Standards for Surveying in New Mexico should be corrected. My concern was seemingly ignored when I first brought it to their attention – before the July 24, 2016, Standards were formally adopted. I stated that I did not know a single competent surveyor who would vote to approve a minimum standard for basis-of-bearing that required elevation as part of the documentation. Yes, that is a serious allegation.

Following a subsequent unsuccessful appearance before the BOLPEPS expressing my desire to eliminate the defect, I was informed that the revision process is quite lengthy and that I knew very little about functions of the BOLPEPS. Reality check – they were right on both counts. Since then I have attended many of the BOLPEPS meetings and have learned much. I have a much better understanding of what the BOLPEPS does and am impressed by the countless hours and meetings

the BOLPEPS members devote to public service. Perhaps of more consequence, I understand that now (in 2020) revisions to the Minimum Standards (with input from NMPS) are being drafted and that subsequent Public Hearings will be scheduled. NMPS deserves credit for thoughtful participation and I am optimistic that the embarrassing defect will be eliminated.

- A similar issue came up regarding the “Minimum Standard Detail Requirements of ALTA/NSPS Land Title Surveys” effective February 23, 2016. In January 2016, the National Council of Examiners for Engineering and Surveying (NCEES) hosted a “Future of Surveying Forum” in San Diego, CA. Representatives from 18 surveying-related organizations attended the forum and discussed perspectives and challenges facing the surveying profession. NCEES established a Basecamp Forum to facilitate follow-up discussion of the issues. On April 19, 2016, surveying educator, Bill Hazelton, posted an item to the Basecamp Forum in which he noted a discrepancy in the wording of the 2016 ALTA-NSPS Minimum Standards. Paraphrasing his comments, Bill noted that the standards call for reporting the Relative Positional Precision between any point on the survey with respect to any other point on the survey based on a properly weighted least squares adjustment. That is not possible using currently available software without running a separate adjustment based on holding each point in turn from which such relative positions are computed.

Technically, Bill is correct, but customary practice relies on an error ellipse of each point referenced to the survey control point(s) held by the user. I posted a response dated April 20, 2016, noting that the global spatial data model (GSDM) uses a mathematical definition of local accuracy which can provide the relative position of each point with respect to each other point with a single run of a least squares adjustment. Bill responded with an appropriate comment.

As a follow-up to the NCEES Basecamp Forum, I had the opportunity to write a paper containing an example (with all the details) based on a GPS survey of the NMSU EDM Calibration Baseline observed by Bob Green of Vectors, Inc. in Albuquerque. That paper titled, “Concepts of Spatial Data Accuracy Need Our Attention” was presented at the Surveying & Geomatics Educators Society (SaGES) Conference in Corvallis, Oregon, July 30 to August 3, 2017, and is available at:

<http://www.globalcogo.com/EFB-SaGES-ALTA-NSPS.pdf>

Mr. Gary Kent is the Chair of the ALTA/NSPS Minimum Standards Committee which is responsible for developing an up-date to the ALTA/NSPS Minimum Standards. I’ve been working with Mr. Kent on such a revision and am pleased that his committee has found a workable (although not perfect) solution for the next version of the ALTA/NSPS Minimum Standards.

- In 2008, CRC Press published my book, “The 3-D Global Spatial Data Model: Foundation of the Spatial Data Infrastructure.” The book documents mathematical definitions of network accuracy and local accuracy. That material was challenged in a 2010 article, “Rigorous Estimation of Local Accuracy” written by T. Soler and D. Smith – both employees of NGS. In a subsequent round of Discussion and Closure it appears that the two sides were talking past each other and failed to correctly identify the source of disagreement. The issue was “dormant” until ASCE published another article (on-line) by T. Soler and J. Han in July 2017, “Rigorous Estimation of Local Accuracies Revisited.” The print version of that article was published in the November 2017 issue of the ASCE Journal of Surveying Engineering (JSE). Omitting many intervening details, a second round of Discussion and Closure was published (on-line) by ASCE in March 2019. The print version appears in the May 2019 issue of the JSE. **The integrity of the GSDM has been validated again!**

A free pdf file of the Discussion as published by ASCE has been downloaded more than 700 times since March 2019. That pdf file is available at:

<https://ascelibrary.org/doi/full/10.1061/%28ASCE%29SU.1943-5428.0000274>

As author of the Discussion, I know it is not an easy read. I am therefore tempted to believe that persons downloading the Discussion are probably above my pay grade. What will be the ultimate impact of the Discussion? I don't know but (with repeated validation) I am even more convinced that the GSDM represents an opportunity for the surveying profession to "polish our image."

- In 2019, attempting to generalize the challenge of adopting a comprehensive 3-D spatial data model I posted a 1-page summary of "The Role of a Model" in which I argued that the best model for a given application is the simplest model that adequately addresses the circumstances. In that 1-pager, I listed and briefly described 14 examples of models being used in various applications.

More recently I have written and posted information supporting the "adequate" features of the GSDM and, separately, the "simple" features of the GSDM. The context for the adequate part of the argument puts the performance of the GSDM up against the low-distortion projections being advocated by NGS for use on the 2022 datum. Very briefly, the GSDM accommodates 3-D digital spatial data while the LDPs are strictly 2-D. Modern measurement systems collect 3-D digital data routinely and adoption of an integrated 3-D spatial data model is viewed as inevitable.

On the "simple" side, the point is made that computation of any 3-D position is readily accomplished using standard well-tested rules of solid geometry. The GSDM equations and processes are all in the public domain and are readily available to anyone. In contrast, LDP implementation is built on more complex equations and processes. Yes, an LDP is legitimate and, used correctly, can work very well. But the user is typically beholden to the designer of the projection and/or the author of associated software. It might not be a fair comparison, but we no longer use logarithms for routine traverse computations (they are still legitimate) because more efficient methods are readily available that are much easier to understand. I see a parallel with the GSDM and LDPs. Three items for further reading are posted at:

<http://www.globalcogo.com/simple.html>

Understand. . . the integrity and validity of the GSDM have been confirmed repeatedly. I've provided examples in the cases described in this article. The entire 3-D concept represents an enormous challenge for the surveying profession – but is not being "forced" on anyone. There are opportunities for anyone willing to devote time and energy to learning more about basic spatial data concepts and for anyone committed to providing better professional services to the public. With your help, we can and will do better. Long live surveying!

Restating - I prefer describing a vision to complaining about what is not being done. Come to think of it, yes, I did do some chest pounding. Let's say I did it for you. We, the surveying profession have much to offer and we should do a better job of serving the public. But wait. . .

Aren't many surveyors already competently serving the public? Emphatically - "Yes!" Carry on!